THE physiotherapy REVIEW

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Lateral Fascial Transplant for Controlling a Gluteus Medius Limp

Charles L. Lowman, M.D.

Several operative procedures have been used in attempts to control the lurching gait caused by the loss of, or serious weakening of, a gluteus medius muscle. The procedure to be described here is an approach which we are using at the Orthopaedic Hospital in Los Angeles, with the aim of transmitting power from the external oblique muscle of the abdomen to the trochanter major to aid in lateral stabilization of the pelvis on the hip joint. Normally, such lateral stabilization is attained chiefly through the action of the lateral gluteus muscles, aided by the tensor fascia femori.

The upper trunk is stabilized on the pelvis by the abdominals, lower spinal muscles and the quadratus lumborum. Whenever one foot is taken off the ground the gluteus medius of the opposite side is immediately thrown into action so as to hold the pelvis steady on that side and maintain equilibrium. Its base of action is its origin along the lateral aspect of the ilium and it acts intrinsically as an abductor of the leg at the hip joint through its concentric pull on its insertion in the greater trochanter. It acts in the reverse, or eccentrically, when it aids in holding the pelvis steady as in standing on one leg, or in pulling down one side of the pelvis in order to raise the opposite side.

The gluteus medius, therefore, is an extremely important muscle in maintaining lateral body balance and in providing essential action in normal locomotion. Whenever function is interfered with by slackening the gluteus medius the toggle action on the hip joint is impaired, resulting in a waddling gait such as occurs in coxa vara, congenital dislocation of the hip, or fracture of femoral neck healed with displacement upward of the trochanter and consequent inefficient application of the force applied thereto.

Instability of the trunk and pelvis in such conditions is manifested by a positive Trendelenburg sign (i.e. when standing on the affected leg with the opposite foot raised, the pelvis on that side sags down to the point where the gluteus and other lateral hip muscles of the standing side can get a purchase.) This illustrates the important biomechanical law that when the gap between origin and insertion of a muscle becomes shortened the maximum performance of that muscle cannot be obtained. In other words, much of the contraction of the muscle is used up in taking up slack before it exerts a pull on its points of attachment. It is rendered inefficient by reduction of its range of action. The importance of this muscle's function is made clear when it is absent or weakened as in poliomyelitic involvement. Its performance as a leg abductor and as a lateral guy wire in maintaining body balance is lost and hip joint action in certain planes is impaired in proportion to such weakness or loss.

In such instances the poliomyelitis patient's stance and gait are markedly disturbed. Because of lateral instability he soon finds that he cannot stand on the affected leg without his hip "giving way," and causing a fall. To prevent this he throws his body weight strongly towards the affected side so that the gravital thrust forces the head into the socket by raising the pelvis on the opposite side. This tightens the inner hip joint ligaments and the adductor muscles. We do not know with mathematical accuracy just how weak a gluteus medius muscle must be before such action is necessary, but speaking clinically, if it is reduced approximately 50 per cent in strength

Director of Education and Rehabilitation, Orthopaedic Hospital, Los Angeles, Calif.

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the patient cannot trust it and begins to modify his gait.

This lurching gait causes bad secondary effects at the knee and foot: When the affected leg is brought forward to take a step, the shoulder and upper trunk and arm are thrust laterally over the affected hip just as the foot hits the ground. Due also to the fact that the pelvis on that side is being rotated forward on the opposite or standing hip, the pressure against the inner border of the foot resists the rotatory inward-downward thrust of body weight from above. This cross-thrust weakens and stretches the internal lateral ligaments at the knee. The ankle is forced towards valgus while the counter force against the foot abducts it, forcing a rotatory twist to the lower leg via the mortise of the ankle joint.

This shift of body weight and tilt of pelvis downward on the affected side slackens the abductor muscles (because origin has approached insertion) making it impossible to use whatever power may still remain in the abductors. Some atrophy from disuse occurs gradually, adding further to their paresis.

Realizing that the normal function of a muscle requires that its point of origin as a base of action be held stable, it occurred to me that if the lateral trunk stabilizers were normal, some of their force could perhaps be transmitted directly to the trochanter. Previous experience had shown that power could be gained anteriorly by fascial extension from the upper rectus abdominis to the front of the thigh, where it was attached to the distal ends of the detached sartorius and tensor fascia femori muscles.

In this gluteus medius operation a four-inch incision was made from just below the crest of the ilium upward in direct line with the great trochanter, the external abdominal oblique being exposed where its heavy lower fibers run directly downward to their iliac insertion.

By blunt dissection through the muscle fibers an opening was made to allow a finger to be passed from front to back under a good-sized portion of the muscle fibers about one and a half to two inches in width. Further separation was made on each side above to a distance of two and a half to three inches and its attachment severed just above the crest, extraperiosteally. The dead space thus caused was closed and the fascia drawn together so that no raw surface would be under the new muscle. Next, along the side of the thigh an incision was made sufficiently long to get a length of fascia to reach from the trochanter to the new muscle and extend to the top of the trochanter. Then a strip about an inch wide was made, severing it below and turning it upon itself. The end was carried through a subcutaneous tunnel straight up to the upper wound.

The lower end was firmly fixed with heavy silk sutures to the trochanter at its base and the leg incision closed by an assistant after the leg was placed in abduction to 40 degrees. Next a hemostat was run obliquely downward through the detached section of the oblique muscle, emerging in the middle of its lower end. The scarified end of the fascial strip was grasped by it and drawn upward against a strong downward pull made on a strong clamp which grasped the lower end of this muscle. While thus held, strong silk sutures fastened it above and below. The redundant portion then was wrapped around again, passed through the muscle mass and similarly sutured. The margins of this muscle bundle were drawn towards each other to make a conical shape. Deep closure was made by #0 chromic, superficial fascia with #0 plain, and the skin with silk.

Flat dressings only were applied to the wounds, and the patient was put to bed, flat, with wide leg abduction maintained by broad eight-inch flannel bandages—one loop around the leg above the knee to maintain abduction, another around the pelvis, passing to the opposite side of the bed to counter it, and a third around the chest and fastened to the same side as the first to prevent the body from moving over in line with leg.

Stitches were removed at the end of the second week and in the third week patient was sent to the pool and started on exercises—abduction of both legs and cautious side-bending and downward pushing with opposite leg. At the beginning of the fourth week, walking in deep water was started with emphatic instruction to the patient to push his pelvis over towards the affected side. This allows the patient to feel the tension of this new lateral band, encourages him, and gives him confidence. Also it keeps the pelvis high on that side and increases the distance between the trochanter and the crest. This makes tension on the weakened gluteus and encourages whatever action it can make. While the patient stands and attempts to keep his balance it is desirable to have the technician from behind try to push him gently off balance and he attempts to recover each time. This helps to activate old motor patterns of equilibration and at first this is often more effective than direct intrinsic action.

About the end of the fourth week, the patient begins to walk out of the water, using crutches and braces if necessary, and paying especial attention to keeping lateral pressure against the

transplant. The use of crutches prevents the patient's previous tendency to lurch and throw over the trunk. It is essential to build up a correct motor pattern and as far as possible to prevent all tendency to slip back into bad old habits. When the leg is short it is especially important to raise the heel on the affected side. This raises the pelvis on that side and keeps tension on the transplant and the gluteus which, as mentioned above, is essential to best function.

Our first gluteus medius transplant patient was an eight-year old Mexican boy whose operation was done in 1939. His inability to speak or understand English prevented his gaining as much improvement as was obtained in later cases. In his case, in which little power remained in the gluteals, we ran the fascial strip through a tunnel in the trochanter. In later cases we simply scraped off the fat at the point of reversion of the strip (down on the side of the trochanter), suturing it on each side and in the middle with strong silk. This lower attachment seemed more effective mechanically in pulling over the trochanter and giving a more powerful thrust against the acetabulam by altering the leverage, increasing the toggle action.

This procedure seems to be sound because the gluteus medius and external oblique are synergistic in action and, for many movements, are stimulated together. One major postulate of tendon transplantation, i.e. a pull in direct line is used, and there is some fulcral action over the crest of the ilium to the trochanter.

Functional results from the operation have varied from 25 to 80 per cent improvement. Some patients, while still in bed, could in two weeks actively abduct the affected leg. This abduction appeared to be done largely by the transplant because of the actual palpable action of the muscle above and the fact that the weakened gluteus could scarcely become very effective in two weeks. In all cases there has been a noticeable lessening of fatigue in standing and walking; in some cases a marked lessening of the limp, and in one case its nearly complete correction.

It is perfectly feasible to begin very cautious active assistive movement while still in bed beginning after a week. The leg may be placed cautiously toward adduction just to the point of tension and with the weight of the leg carried on the technician's hand. Two or three abduction efforts may be made.

One young man who had suffered from an infectious myelitis said that he could step forward better than before. Previously he had had a transplant anteriorly from rectus abdominis to thigh which performed better after the lateral transplant improved the lifting power on that side.

In operating on a young man with a rather severe limp and unopposed external rotation of the leg on that side, we made a recent modification of technic. We cut a strip about one and a half inch wide which we split in two portions both attached at the trochanter. The posterior half was passed across the trochanter behind the anterior half and with leg held in moderate internal rotation, it was passed forward and attached osteoperiosteally to the ilium just below the anterior superior spine. The other half was then carried up and used as indicated above. This lad's very unstable hip was much improved. During his pool treatments he found that he could adduct the thigh, which he had been unable to do before. This was probably because formerly all efforts to move that leg immediately activated the overacting external rotators which automatically placed the thigh in such a position that adduction and inward rotation were prevented.

During the past 8 years we have done approximately a dozen of these transplants and feel that there is a definite place for this procedure. It is comparatively simple and requires no fixation in a cast during the postoperative period. As previously reported in regard to the abdominal fascial transplants, the fascial strip increases in size and strength in direct relation to its use. Consequently, patients improve as they learn how to use the transplant and become generally improved in their body mechanics and function.

In some instances where there may be a very short leg a very high sole is required, or in cases of flat hip socket or ligamentous laxity the end performance may not be as good as one would like. However, all of the patients say they feel more secure and the improved stability lessens fatigue.

Functional Efficiency in the Physical Medicine Service

Holland C. Mitchell, M.D.

The Medical Staff

Each physical medicine service, whether located in a hospital or in a separate unit, should be under the direct supervision of a physician. At present there is a lack of physicians properly trained in physical medicine. In most hospitals, both public and private, the medical supervision and contact with the physical medicine service are grossly deficient. The physical therapist simply attempts to follow the directions of the prescribing physician, who may or may not have adequate knowledge of the basic principles of the treatment which he has prescribed. The occupational therapist attempts to provide the proper therapy on the basis of a prescription which may not indicate whether the treatment is to be functionally corrective or merely diversional. With the emphasis that is now being placed on physical medicine in medical schools, it is to be anticipated that the physician of the future will be able to prescribe properly and to evaluate this form of therapy. The medical supervisor or administrator of a physical medicine service should have specialized knowledge and experience in physical medicine. The physical medicine physician or "physiatrist" should have a broad background of medicine and surgery in order that he may be able to recognize pathologic change and evaluate the treatment being used. It has aptly been said that the "physiatrist" must first be a good physician in order to be successful. However, his success does not depend entirely on his qualifications. It depends just as much on the amount of time that he can spend with the service. The more contact that he has with the referring physicians, the therapists and the patients, the better are the results to be expected from the treatment given. Therefore, for greatest efficiency the physiatrist should devote all of his working hours to active participation in the work of the physical medicine service.

In some hospitals there may be members of the medical staff who use physical medicine to a very limited extent. When this condition exists the specialist in physical medicine should take every opportunity to make the medical staff members physical medicine conscious. This can be done easily through individual conversation and through discussion at staff meetings. The medical staff members and the referring physicians also should be encouraged to read the "Manual of Physical Medicine" and the "Handbook of Physical Medicine." At all times the physiatrist should emphasize the fact that no one type of physical therapy agent is sufficient in itself, but that the combination of the various agents in conjunction with proper medical or surgical treatment is what produces good results.

Again it should be emphasized that the greatest efficiency is promoted when there is a maximum of contact between the physiatrist, the patient receiving treatment, and the referring physician. The referring physician expects the physiatrist to prescribe treatment and to decide how long it is to continue and when changes are to be made. Too often physical therapy is the only treatment being given, proper medical treatment and supervision by the referring physician or ward physician not being a part of the program. In the private hospital the duration of a series of treatments may depend in part upon the financial condition of the patient. On the other hand, in free clinics and in tax-supported institutions the patient may want to continue treatment long after the maximum results have been obtained.

The Chief Therapist

The chief therapist usually is a woman. On her depends the success of the department to a great extent. Her ability to organize the work and distribute it fairly among the therapists will be reflected in the amount and the quality of work done. If a physical therapist feels that she is being made to do too much of the mas-

812 Beloit Ave., Forest Park, Ill.

Assistant Chief, Physical Medicine Service, United States Veterans Administration, Hines, Illinois.

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sage and too little of the short wave therapy, for example, that physical therapist will be disgruntled and will feel that she is being imposed upon. This feeling undoubtedly will be reflected in her work and the patient may be aware of her attitude. If the occupational therapist is allowed to work with one type of patient too long, she will lose interest and will be unable to stimulate the interest of her patients. The chief therapist should distribute the work through the day so that the therapists are not overburdened during short periods. Through a proper distribution of work, each patient will receive his allotted time in the department and will not feel that his treatment was a mere gesture due to lack of time, or fatigue, on the part of the therapist. The chief therapist should be easily approached by the therapists who will frequently desire to ask questions about the condition being treated or the proper technic to be employed. When they ask questions, they should be made to feel that they are evidencing a desire to learn and are not simply displaying a lack of knowledge or proficiency. The chief therapist also should welcome the suggestions of her co-workers and do everything possible to maintain close contact with them. In this way she will have a better knowledge of what is going on in the department and the quality of the work being done.

The manner in which the chief therapist offers suggestions to the other therapists is important. No therapist wants to receive criticism in the presence of a patient. Therefore, the suggestions offered in the treatment room should be very casual and of a definitely helpful type. In most cases a suggestion can be given privately after the treatment has been completed. However, if the chief therapist feels that the information should be given immediately, she should be able to give it in a diplomatic and inoffensive manner.

In order to be of maximum assistance to her staff, the chief therapist should keep herself abreast of new physical medicine procedures and results of treatment. She should be a member of the various societies, attend their meetings regularly, and encourage the other therapists to do likewise. She should hold frequent departmental conferences and lead in the discussion of current trends in the physical medicine field. She should cooperate closely with the physiatrist and pass on to him any questions that she or the other therapists have regarding technic, contraindications, and the advisability of giving treatment under new conditions which would modify the effect of the treatment employed. At no time should the chief therapist indicate to another therapist or to a patient that the treatment which the physiatrist has prescribed or approved is not what she considers proper. A difference of opinion can be settled easily through private discussion or in departmental conferences. The chief therapist should at all times conduct herself in such a manner as to merit the respect and loyalty of each of the therapists in the department.

STAFF THERAPISTS

Proper treatment can be given only by well trained therapists. With the emphasis that is now being placed on specialization, it is important that only registered physical therapists and occupational therapists be employed. However, there are several reasons other than inadequate training why a therapist may give inadequate treatment. Simple laziness is probably the most common one. Physical handicaps may be a factor in some cases. Advancing age may be a factor in others. The technic may be poor, as when a physical therapist giving massage assumes a strained and tiring position. Disinterest may be a reason. Disinterest and lethargy should not be allowed to prevail among the personnel of the physical medicine service and can best be combated by education. The physiatrist should keep the therapists informed of the latest medical reports on physical medicine and should encourage the therapists to read these reports themselves. Current events relating to physical medicine may be brought to the attention of the therapists so that they may at all times maintain an up-to-date knowledge of their special field. It is well to encourage the individual therapists to write papers on subjects in which they are particularly interested. The physician should keep available an indexed file of magazine articles and reprints on physical medicine subjects. The therapists should be encouraged to join national and local associations and to attend their meetings regularly. During departmental meetings the problems of the therapists should be discussed frankly. New ideas should be encouraged and carefully evaluated. Any contribution which a therapist offers to increase the efficiency of the department should be welcomed and due credit given. In this way the physical medicine service can be kept alive and reactive to the progress being made in this branch of medicine.

The therapists should be warned against making improper remarks to patients concerning their treatment. A therapist may suggest to a patient that he speak to the physiatrist with reference to a change in treatment. If the physician does not approve of a change the patient

may feel that good medical judgment is not the factor which prevents him from receiving the suggested change. However, if the physician is well trained, if he is active in the department and is well acquainted with the patient's history and has examined the patient at frequent intervals, there should be no occasion for suggestions from the therapist, and the patient should have full confidence in the opinions rendered by the physician.

THE PATIENT

In the vast majority of cases the treatment program runs smoothly, but in some cases there will be dissatisfaction, either with or without cause. A patient may show a preference for a certain treatment. If he is receiving radiant heat he may ask for diathermy because he sees some of the other patients receiving this electrical treatment. It may be difficult to convince such a patient that he is receiving the proper treatment. In the hospital and after they go home, patients like to talk about the electrical treatment they received, and simple massage or radiant heat therapy may hold no glamor for them as they discuss their case. A patient may indicate a preference for a certain therapist and even request the services of that therapist when another has been assigned. Unfortunately, this problem has no happy solution; it will always be present because of the personality elements involved. If a strict schedule of treatment is followed, and if proper rotation of the personnel in the department is carried out, the patients certainly cannot feel that they have been subjected to discrimination.

Some patients will stay on therapy indefinitely if this is permitted and may protest very strongly if treatment is discontinued. In the Veterans Administration and in industrial hospitals some of these patients are concerned with the question of compensation and are certainly difficult to handle. Other patients like the hospital surroundings, become interested in some occupational therapy project, and are contented to lead a well regulated life in a hospital. Many clinic patients will go to considerable trouble to come for treatment when rest in bed at home with the use of a hot water bottle or an electric pad actually would be more beneficial. Some are women who welcome the opportunity to get away from the daily drudgeries of the home and meet with others who have similar ambitions. Some are men who come for treatment during very inclement weather while they are building up a case for the compensation board.

In many chronic cases, it is wise to discharge the patient with full instructions for taking treatments at home if the continuation of treatment might prove beneficial and if the home treatment can be arranged. Home physical therapy is a much neglected field and should be considered more often in those physical medicine departments in which the treatment load is heavy. It is far wiser to give longer and better treatment to a small number of patients than to crowd in a large number of patients during a limited time. The prescribing of physical therapy in the home as a convalescent measure will reduce the patient load by making possible an earlier discharge of many patients.

The treatment of psychoneurotic patients is always difficult. It is well not to prescribe physical therapy for such patients except for conditions known to respond satisfactorily. In cases of hysterical paralysis, some form of drastic physical therapy procedure may be given a short trial as a psychotherapeutic measure. If good results are obtained immediately, the treatment may be continued with the prospect of further recovery; however, if no improvement is noted, it should be discontinued. Treatment is terminated as soon as possible so that the patient will not have his mind focused on his condition any longer than is necessary.

OTHER DEPARTMENTS

There are a number of ways in which other hospital or clinic personnel can increase the efficiency of the physical medicine service and help it to function more smoothly. The physician in charge of a patient with an ulcer of the skin can debride the tissue and refrain from the use of ointment when ultraviolet therapy is being used. The nurse on the ward can see to it that the patient is clean and in the proper place or position for receiving bedside treatment. She also can see to it that the ambulant or wheelchair patient reports to the physical medicine department on time and in suitable clothing, and extra covering when it is indicated. She should send for the patient promptly on completion of treatment.

The physical therapy and occupational therapy departments should be physically close together if the physical medicine service is to function as a unit. This promotes the therapy aspect of occupational therapy and makes the patient feel that this therapy is complementary to that received in the physical therapy department. A cooperative spirit between the personnel of these two departments will make the physical medicine service function as a harmonious unit.

Fundamental Considerations of Posture Exercises:

Guided by Qualitative and Quantitative Measurements and Tests

Hans Kraus, M.D., and S. Eisenmenger-Weber, D.Sc.

(Editor's Note: This is the final article in a series of three by Doctor Kraus and Mrs. Eisenmenger-Weber.)

In the first paper of this series[1], measurements and tests for a quantitative evaluation of posture were described. These measurements have been used for four years on all cases at the Posture and Corrective Exercise Clinic of Vanderbilt Clinics.*

The second paper[2] gave a detailed report on 100 cases of poor posture on which these measurements were taken. Included in this report were tabulations and a graphic representation indicating the relative distribution of deviations from the norm.

This paper deals with the basic principles of exercises and indicates how to apply them in the treatment of conditions ascertained by quantitative and qualitative measurements and tests.

The first step toward the formulation of basic principles is to determine a common factor in all therapeutic exercises, which can be found in the clinical characteristics of muscle function. In turn, these are:

a. Muscle power—the ability to contract.
b. Muscle elasticity—the ability to relax or decontract.
c. Coordination—the harmonious and well-timed interaction of the first two.

Based on these clinical characteristics of muscle function the technics of corrective exercises can be classified as:

a. Technic to increase muscle power.
b. Technic to increase muscle elasticity.
c. Technic to improve coordination.

The Posture and Corrective Exercise Clinic at Presbyterian Medical Center proceeds along these fundamental lines in the examination, analysis, exercise prescription and treatment of posture cases with suitable adaptations to the general hospital routine.

A case history including first and subsequent measurements and tests with exercise prescription and exercise program is given to illustrate the effect of exercises on muscle qualities.

History

Physical exercises have played an important role in practically all civilizations—ancient and modern, oriental and occidental. In different nations and in different ages exercises have been used for a wide range of purposes, such as religious practices, military training, general physical education, esthetics and therapeutics.

The origin of physical exercises takes us back to the ceremonial and ritual dances of barbarous tribes. The oldest system known and still practiced is the oriental religious body training Yoga. A religious practice in the Orient, it has been adapted to a physical body training in the occident. The rich Greek culture has influenced all western civilizations. The Greeks comprehended fully the relation between exercise and health. The gymnasium was a factor in education as well as in medicine. During medieval times, body culture, though considered sinful and evil, was utilized to cure diseases.

With the Renaissance came not only renewed interest but special emphasis in all forms of body exercises and physical culture. Rousseau rediscovered the importance of physical exercise in relation to health of body and mind and also insisted upon its importance in education.

Towards the close of the 19th century the therapeutic value of exercise came into recognition in England and many countries on the European continent. Professor L. Jahn in Germany was among the first exponents of systematic exercises. His teachings and publications, together with the founding of "Turn Vereins" marked the beginning of a general widespread realization of the effect of systematic physical exercise in developing strong bodies. Henrik Ling of Sweden (1776-1839), the founder of the Royal Central Institute of Gymnastics in Stockholm, classified exercises according to their ultimate objectives as: Pedagogical, military, esthetic and medical. By his sharp differentiation as to purpose, remedial exercises became a separate unit and eventually were accepted as a therapeutic measure. Treatment by physical exercise is now embodied in the practice of physical medicine.

At the close of the 19th century physical exercise became a significant part of the general health program, since changes in the world economy forced millions of adults into a life in crowd-

*Columbia Presbyterian Medical Center, 622 West 168th St., New York, N. Y.

ed areas. At the same time the normal play of children became restricted in the large and densely populated cities. Thus the necessity for corrective postural exercises has grown rapidly and their therapeutic value has been officially recognized by taking them into the school curriculum. This is a step in the direction of preventive medicine.

At present, many systems of corrective exercises are in use; these vary widely in technic. Taking for granted that the purpose of corrective exercises is remedial effects in the shortest possible time, none of these systems by itself is sufficiently effective.

Since the history of physical exercises has shown such great variety of their purpose, one can expect to find many different technics. A cursory review gives the impression that they are so fundamentally different that it might be hard to find any common element in them. Still a common basic factor must exist in all forms of exercises because they deal with one specific physiological unit—the skeletal muscles. The inherent clinical characteristics of the skeletal muscles leads to a common basis for all exercises, regardless of the purpose of their use, of their ultimate aims and of whatever pathological condition is present.

CLINICAL MUSCLE PHYSIOLOGY[3]

The evaluation of muscle function is based on three characteristic qualities of the striated muscles, namely:

I. Muscle power—the ability to contract and produce work.

II. Total muscle elasticity
   a. "Physiological elasticity"—the ability to relax and actively give up contraction.
   b. "Mechanical elasticity"—the inherent physical elasticity similar to that of a coil spring.
   c. Total elasticity—the combination of a and b.

III. Coordination—the interaction of muscle groups and nervous system in synchronizing contraction of the protagonist and decontraction of the antagonist muscles.

Further elaboration on coordination is clearly beyond the scope of this article since it involves the nervous system and therefore will be omitted. However, a thorough understanding of muscle power and muscle elasticity is essential in giving corrective exercises since the same motion may have a power building or relaxing effect, according to the technic applied.

I. *Muscle power* is produced by increasing tension in the muscle. This increase in tension, usually called "contraction,"* is not necessarily associated with a shortening in muscle length. There are three different aspects of increased muscle tension which can be related to muscle length:

(a) "Concentric contraction" — increase in tension combined with a decrease of muscle length.

(b) "Isometric contraction"—increase in tension with no change of muscle length.

(c) "Eccentric contraction"—increase in tension combined with an increase of muscle length.

For example, (a) the flexors of the elbow may increase in tension and decrease in length when the elbow is actively flexed; this is "concentric contraction."

(b) The flexors of the elbow may be consciously made to increase in tension, as in a muscle setting exercise, without any movement resulting at the elbow and without change in muscle length; this is "isometric contraction."

(c) The flexors of the elbow may increase in tension to the maximum of their capacity against an overpowering pull by an outside force in the opposite direction. The elbow will be forced from a flexed to a stretched position in spite of increased muscle tension in the flexors. This will result in increased tension and increased length in the elbow flexors; this is "eccentric contraction."

II. *Total elasticity* of muscles is related to a decrease of tension in the muscle. Here again there are three different aspects of decreased muscle tension or "decontraction"**—which can be related to changes in muscle length, though usually relaxation or decontraction is associated with increase in muscle length.

(a) "Eccentric decontraction"—relaxation or decontraction, combined with an increase in muscle length.

(b) "Isometric decontraction"—relaxation or decontraction with no change in muscle length.

(c) "Concentric decontraction" — relaxation or decontraction combined with a decrease in muscle length.

For example, (a) the flexors of the elbow may be relaxed (decontracted) and lengthened when

*Though the term contraction implies shortening of the muscle length, it is here used synonymously with muscle tension, in accordance with established practice.

**The term decontraction is used to imply that the "physiological" elasticity as a physiological function is more important than the mechanical elasticity on which it is superimposed. The latter is always present as in a coil spring.

the elbow is being stretched from a flexed position to full extension. This is "eccentric decontraction" (eccentric relaxation).

(b) The flexors of the elbow may be fully consciously relaxed without any movement at the elbow joint and without change in muscle length. This is "isometric decontraction" (isometric relaxation).

(c) The flexors of the elbow may be fully consciously relaxed or decontracted while the elbow is passively carried from a position of full extension to a flexed position, in which case the elbow flexors length will decrease in spite of complete relaxation or decontraction. This is "concentric decontraction" (concentric relaxation).

BASIC PRINCIPLES OF THERAPEUTIC EXERCISES

Underlying all therapeutic exercises is the fact that properly conducted systematic exercises produce changes in the clinical characteristic qualities of muscles:

(a) Frequent and intensive contraction carried beyond the normal demands of daily life improves a muscle's ability to contract and thus increases muscle power.

(b) Frequent and intensive decontraction or relaxation carried beyond the normal demands of daily life improves a muscle's ability to decontract or relax and thus increases muscle elasticity.

TECHNIC

The three different aspects of muscle contraction representing muscle power or work done and the corresponding three aspects of muscle decontraction or relaxation illustrated in the one simple exercise of flexion and extension of the arm show that an identical movement or exercise may be a power building exercise or a relaxation exercise increasing muscle elasticity according to the technic used. Therefore any prescription for a corrective exercise must not only state the muscle group but also the muscle quality desired. Accordingly, corrective exercises will fall into the two following categories:

1. Exercises to increase muscle power.
2. Exercises to increase total muscle elasticity.

In order to apply the same principles in correcting postural defects a thorough analysis of the case by structural and functional measurements and tests is necessary. The exercise prescription must then indicate which muscle groups require power building and which muscle groups require exercises for increased elasticity. Coordination exercises are added only *after* a normal balance between opposing muscle groups is reestablished.

For power building as well as for increase in muscle elasticity the muscle should be "warmed up" before the maximum power, that is, work, and the maximum elasticity or muscle length is demanded of the muscle.

Power Building Exercises must be graded, not only for the "over-all program" to be carried out until the ultimate aim is achieved, but for each exercise period. Every muscle group should be carried through a series of exercises, starting with mild exercises and working up to the maximum performance possible at the time and finishing with mild exercises. The ascending graph of power expenditure represents the "warm up", the height of the graph represents the "peak performance" (usually active motion against gravity, resistance by the physical therapist or weights), the descending graph represents the "warm down" or cooling off period.

Exercises to Increase Elasticity. If exercises are prescribed to increase elasticity and muscle length they should be graded in the same way. Active relaxation should be followed in the ascending graph by active decontraction and lengthening of the muscle. The height of the graph will be represented by intensive active decontraction combined with a pull (usually exerted by the physical therapist or weights) to increase muscle length. The descending graph returns to active decontraction and relaxation.

In grading exercises for each exercise period and in grading the entire exercise program over the full extent of treatment, three factors are to be considered: (1) exercise value, (2) fatigue and (3) pain.

(1) *Exercise Value*—A positive and increasing exercise value must be given to achieve results. Muscle power increases only by an increased demand for greater power and muscle elasticity increases only by a greater demand for muscle elasticity or muscle length. This increased demand on muscle function must surpass the amount of muscle performance in everyday life. It must be increased gradually until the ultimate aim, the correction of the postural defect, is reached.

(2) *Fatigue*—Fatigue often is a cause of postural defects and therefore fatigue must be watched carefully. Interspersing the exercise program with relaxation and breathing exercises, as well as insisting on the exercises being carried out slowly, helps to avoid fatigue.

(3) *Pain*—In corrective posture exercises, pain may occur in stretching of contracted muscle groups, as for instance the hamstrings or pectoral muscles. Active and passive stretching should always remain below the pain limits.

For example, the analysis of dorsal kyphosis and lumbar lordosis cases shows weakness in the upper back muscles and the abdominal muscles and shortness or contraction of the pectoral and hamstring muscle groups. All these muscle groups contract and decontract, corresponding to power building and decontracting or stretching exercises in everyday life, regardless in what age group. Therefore, specific exercises must be given with an increase over the demand of everyday life in order to produce a change in these muscle qualities, namely, power building for the upper back and abdominal muscles and increasing the elasticity of the pectoral and hamstring muscle groups. The power performance, that is, contraction, of the weak muscles as well as the demand for muscle relaxation and muscle length of the contracted muscles, must be steadily increased until a proper balance between the opposing muscle groups is regained.

As each exercise period should be graded, the "over-all program" of corrective exercise must be so graded as to increase the demand for power and elasticity, until these muscle functions are at the requested level of performance of adequate and well-balanced muscle power and muscle elasticity. Then, coordination and habit forming exercises are added and tasks of skill and athletic games may gradually substitute for the corrective exercises.

The basic principle of corrective exercises and the technic outlined are applied in correction of general poor posture, as well as in cases with lateral deviations of the spine and unilateral unbalance of muscles.

In scoliosis cases, more detailed and specific examination by measurements and tests is required. Close cooperation with the orthopedic surgeon is essential so that structural defects may be detected and treated accordingly.

For example, the analysis of a lateral deviation, such as a "total left curve", that is, a curvature of the spine from the seventh cervical to the sacrum with the apex (or convexity) on the left side with compensatory curve in the cervical spine, shows the following muscle imbalance: contraction and shortness of the left sternocleidomastoideus and synergists with corresponding weakness on the right side; contraction and shortness of the right pectorals and right medial and lateral fibers of the trapezius and the right rectus spinea and right obliquus muscle with corresponding weakness in these muscles on the left side. These muscle groups contract and decontract bilaterally in daily activities to the degree of habitual use. However, any bilateral activity will not correct unilateral imbalance because muscle groups on both sides of the body are equally exercised. The analysis shows unequal power and elasticity on right and left side; therefore unilateral exercises must be given; namely, power building exercises for the right sternocleidomastoideus muscle and synergists with corresponding exercises for increased elasticity and muscle length on the left side, and power building exercises for the left pectoral muscle group, the medial and lateral fibers of the trapezius, the left rectus spinal, and oblique muscle, with corresponding relaxation exercises for increase of elasticity and muscle length on the right side.

Unilateral exercises increase the power performance of the weaker muscles and increase the elasticity of the foreshortened muscles and thus establish the balance between right and left side and correct the condition. Substitution and compensatory motions are to be carefully avoided.

Structural and functional measurements and tests analyze posture and make prescription for specific exercises possible. By comparing the first and subsequent measurements and tests the effect of corrective exercises can be closely followed and necessary adjustments made in the exercise program. For example, if measurements and tests in dorsal kyphosis and lumbar lordosis show marked improvement in the plumbline measurements of the dorsal kyphosis with little improvement in the lumbar spine; that the angle of the pelvic tilt has changed slightly, but the angle at the shoulder joint indicative of the length of the pectoral muscle has come to normal; and that the abdominal muscle power has increased only slightly compared with a marked increase in power in the upper back muscles, then the exercise program must be altered. Concentrated effort will be made to correct the lumbar lordosis by increasing power building exercises for the abdominal muscles and pelvic tilting. Effectiveness of treatment is further checked by repeating comparison of measurements and tests until they come within the norm as far as it is known at present. Allowance for individual deviations and inaccuracy of measurements (up to 5 per cent plus or minus) will have to be made.

CLINIC ROUTINE

At the Posture and Corrective Exercise Clinic of Vanderbilt Clinics, all cases are referred for correction of postural defects by the Pediatrics Out-Patient Department, or by Babies Hospital.

At the first visit the measurements and tests described in the previous articles[1,2] are taken

and exercises prescribed accordingly. Possible contributory factors are considered. These may be poor vision or hearing, upper respiratory obstructions, soft beds, school work in one-armed chairs, sitting, standing and carrying habits, shoes, etc. The exercise program is worked out following the prescription and in accordance with the previously stated principles. All exercises used at the Clinic are classified as mild (A), medium (B) and strenuous (C) exercises. This facilitates grading of the program. Since comparatively few physical therapists are available to treat the many cases referred, general "warm-up exercises"* are given to a group of 10-15 children on floor mats. All parts of the body are used in these warm-up exercises but no specific power building or stretching demand is made on any muscle group so that practically all children can join in these group exercises from the start. After the warm-up group, child and parent receive instruction in the individually prescribed exercise program. Only a few exercises are shown at each visit. New exercises are added only when the child and parent know the previously given exercises to complete satisfaction of the staff. Mimeographed sheets with instructions are given to the parent as a reminder. Every exercise period is graded.

For effective correction the patient must devote at least a half hour daily to exercises at home. We expect to see the child twice a week until the full specific program is taught, which takes normally five to six weeks. Then, second measurements and tests are made and if they show satisfactory improvement the patient is safely put on his own with only one visit per week to the clinic. School children come Saturday mornings so as not to interfere with their normal life. Subsequent measurements and tests are made at regular intervals. When these show no improvement, the child must come twice a week again. If measurements and tests show progress, the visits to the clinic are made at longer and longer intervals. When measurements and tests are within the norm, athletic games are advised as substitute for the daily exercises and the case is followed once in six months or once a year. The cooperation of the parents is necessary throughout the treatment. The careful instructing of the parent in how to supervise the exercises at home is essential since the same motion may increase muscle power or muscle elasticity depending upon how the movement is carried out, as has been shown in this article.

A measurement sheet giving the analysis and exercise program of a child with poor posture and slight lateral deviation illustrates how the treatment is outlined and the effect of the corrective exercises recorded by subsequent measurements and tests (See Fig. 1).

The measurement sheet shows the analysis of the case. The treatment record sheet states the diagnosis, who referred the case to Posture and Corrective Exercise Clinic, result of orthopedic consultation and X-ray examination if any and gives the exercise prescription in a general outline since the treatment program is given in full detail. Each patient's visit is recorded as well as each examination by the physician and retaking of measurements and tests.

TREATMENT RECORD

Name: J. B. Hospital No. 512873
Referred by Pediatric Outpatient Department
General poor posture with slight lateral deviation
Rx: Power building exercises for back and abdominal muscles. Unilateral exercises to regain balance of right and left side. Exercises to increase elasticity of foreshortened muscles. Stress unilateral exercises and exercises to increase elasticity of hamstring muscles.

PROGRAM

[*Exercises classified: mild (A), medium (B) and strenuous (C)*]

Warm-up Group

Breathing Exercises

Lying over sand bag with deep breathing (A).
Breathing with lateral arm swing (A).

Abdominal exercises

Tip up (A).
Sitting up (graded) (B).
Double knee kiss (graded) (C).
Heelslide (A).

Trunk exercises

Wingspread active assisted, then active (A).
Wingspread active resisted (later) (B).
Aeroplane (C).
Trunk raise active assisted, later active (B).

Hamstring stretches

First 10 minutes: Infra-red light on posterior aspect of both thighs, then:
Toe touch (avoid increase in dorsal kyphosis) (A).
Hamstring stretch active and with additional stretch by physical therapist (B and C).
Standing stretch (A).

Unilateral Exercises

Scoliosis stretch supine right arm and right leg (A).

*Warm-up group exercises may be obtained in mimeographed sheets and will be sent out upon request.

Shift towards right active assisted, active (A).
One sided stretch on table right arm (B).
One sided stretch on stool right arm and right leg (B).
Four footed position swing of right arm and right leg (C).
Statue raise right shoulder and drop right hip (B).
Breathing on right side lying on left side (A).

Instruction for these exercises, as they are given to the parents are appended at the end of this article.

The analysis of this case together with measurements and corrective exercise programs illustrates that the exercises are carefully chosen in accordance with the exercise prescription, which in turn is logically derived from the findings of deviations from the norm by qualitative and quantitative measurements and tests. The increase of power in the weaker muscle groups and the increase in elasticity and muscle length in the opposing muscles is the *positive aim* to be achieved. The conscious and careful avoidance of an increase in the conditions causing the poor posture might be called the *negative aspect*. Thus, all exercises must be avoided which demand and therefore increase muscle power of foreshortened muscles or muscles showing greater power than their antagonists, or which demand a greater muscle length or elasticity in already weak and overstretched muscles.

Examples: In a case of dorsal kyphosis any exercise increasing the power of the pectoralis major and minor would retard correction of the kyphosis. "Chinning" exercises, for instance, would be harmful. They would tend to increase the condition to be corrected since foreshortened pectoral muscles are an integral part of, and frequently the cause of, a dorsal kyphosis. In the case of a flat back, the obliteration of the normal anterior curve in the lumbar spine, exercises such as pelvic tilting or the exercise of pressing the lumbar spine against the wall would be harmful. They would increase the angle of the pelvic tilt* rather than decrease it as needed for the correction of the deviation.

Bilateral power building or stretching exercises for back and shoulder girdle muscles would be ineffective in a case of scoliosis or imbalance of muscles between the right and left sides of the body. Bilateral power building or stretching exercises for the pectorals, rhomboids and erector spinae muscles could not be effective to correct a condition caused by uneven muscle power and elasticity in these muscle groups on right and left sides of the body. Only power building for the weak and stretching of the foreshortened opposing muscles will result in correction—which is reestablishing even power and even muscle elasticity and length on both sides.

*Angle of the axis of symmetry of the pelvis to the longitudinal axis of the femur.

CONCLUSION

The high degree of specialization in training physical therapists in poliomyelitis, cerebral palsy, postfracture and rehabilitation, relaxation and posture exercises, etc., is of great value but this training must be founded on a thorough knowledge of the basic principles, which relate changes in muscle qualities to exercise.

Postural correction exercises are particularly complex. They always involve many muscle groups. In general functional poor posture cases all different combinations of muscle weakness opposed by foreshortened muscles may occur,* but postural correction also may be called for in conditions with known pathologies, such as poliomyelitis, cerebral palsy, congenital malformations, postfracture. This enumeration of conditions itself proves that the approach to correct them must be varied and that each case must be considered and treated accordingly.

The reason for the difference of opinions concerning the value of exercises in physical medicine probably can be found in the diverse ultimate aims and the great number of ramifications in highly specialized methods of therapeutic exercises for different pathologies. In spite of the seeming diversity the common basic element found in all exercises is their influence on the characteristic clinical qualities of the skeletal muscles. However only systematic study of qualitative and quantitative measurements and test will enable investigators to observe the effect of "directed exercises" on these characteristic clinical muscle qualities.

Critical examination of data furnished by uniform measurements and tests will make it then possible to find the specific advantages of the different methods and technics of exercise systems and to use any one of them, or any combination of them, to achieve the desired result.

APPENDIX
Exercises

Lying on sandbag (A): supine, hands locked behind head, knees raised. Sandbag placed under shoulders. Patient presses elbows down to touch table, deep breathing.

Breathing with lateral arm swing (A): Supine, arms at side of body, knees flexed: swing arms sideways over

*See graphic representation of distribution of deviating in Reference 2.

POSTURE MEASUREMENTS AND TESTS

NAME: B.J. DATE: MARCH 6, 1944
HOSPITAL NO: 512873 AGE: 9 WEIGHT: HEIGHT:

		MARCH 1944	APRIL 1944	MARCH 1945
1. Chest Expansion	Midway	24 1/4	25 1/2	26 1/4
	Inspiration	25 1/4	26 1/8	27 3/4
	Expiration	24	24	25 1/4
2. Scapula - Spine Distance	Right	2 7/8	2 1/2	2 1/4
	Left	2 1/2	2 1/2	2 1/4
3. Level of Scapula at Inferior Angle	Right			
	Left	1/8 high	equal	equal
AT FIRST VISIT, RIGHT SUPRA ILIAC SKINFOLD — — — — — — NO SKINFOLD				SAME
4. Level of Anterior Superior Spine of Ilium	Right	1/8 high		
	Left		equal	equal
5. Leg Measurement	Right	26"		
	Left	26"		
6. Angle of Pelvic Tilt (protractor measurement)		150°	160°	165°
7. Angle of Shoulder Shortness of pectoralis muscle (p.m.)		-170°	-180°	180°
8. Length of Hamstrings (Elasticity) Angle of pelvis to thigh (Legs raised with stiff knees - p.m.)		25°	35°	37°
9. Length of Hamstrings and Back Mobility (Elasticity) Tips of fingers to floor		3 3/4"	touch	touch
10. Strength and Tone of Abdominals (lying on back) Ability to raise both legs with stiff knees to 45 degrees		4	10	10
11. Strength and Tone of Erector Spinae Muscles Lower A. (Legs and pelvis hanging from table) Lift to horizontal position	Seconds	4+	10	10
Upper B. (Trunk hanging from table) Lift to horizontal position	Seconds	4+	10	10
12. Position of feet				
13. Breathing Method		a MARCH '44	pa m APR. '44	pc c MAR. '45
Dorsal Kyphosis 7 cerv.		3/4	1/4	1/2
apex		0	0	0
Lumbar Lordosis 5 lumb		1 1/4	1	1/2

Figure 1.

head breathing in through nose—stretch—breathe out through mouth—hissing—swinging arms down. Relax.

Tip up (A): Supine, hands locked behind head. Knees flexed: Patient pulls abdomen up and in, slightly raising buttocks and pressing lumbar spine against table.

Sitting up (B): Supine, hands locked, stretched to full extension or held behind head. Physical therapist is holding patient's legs. Patient comes up to sitting

position, then gently rolls down to lying position. Relax.

a. Graded either by starting to sit up from an angle of 45°, lessening the angle, or
b. By manual assistance.
c. Sitting up eliminating ilio psoas muscle. As described above but hip and knees in extreme flexion placing feet close to buttocks.

Double knee kiss (C): Supine, hands behind head: Flex both legs and fold them or chest bringing them up so they touch the face, raising lower back from table or mat. Stretch both legs and slowly lower them, holding shoulders and back flat on table throughout exercise. Grade by starting patient with hips and knees flexed, feet close to buttocks, increasing the distance between feet and buttocks gradually.

Heel slide (A): Supine, hands behind head. Bend both knees, bring heels toward buttocks. Slowly slide heels away from buttocks until legs are fully stretched, keeping back pressed against table throughout exercise. Relax.

Wing spread (A): Patient in sitting position, arms straight out at side in horizontal position, palms up or hands locked behind head. Press arms backwards either active assisted or active. Relax.

Same as above but active against resistance (B).

Aeroplane (C): Prone, head and shoulders off table, arms straight out at sides: raise head and upper trunk, chin in. Arms should be held so that palms face upward. Relax.

Trunk raise (B): Prone hands locked behind head: raise head and upper trunk, pressing shoulders and elbows back. Keep chin in. Relax.

Toe touch (A): Patient sitting on floor or table, feet against the wall, knees stiff; touch toes with finger tips. If dorsal kyphosis is present, keep hands locked behind head, looking up and swing body forward.

Hamstring stretch (B): Supine. Patient takes hold of right foot with right hand: stretch knee to full extension. Relax same on left side.

Same as above on both sides simultaneously (C). Relax.

Standing hamstring stretch (A): Patient standing about two feet away from table. Hands hold on to sides of table, patient leans forward until body is in horizontal line from hips to head.

Scoliosis stretch (A): Supine arms at side of body. Stretch right arm up and right leg down keeping back flat on table. Relax.

Shift (A): Patient sitting on table, legs dangling. Keep pelvis fixed; lock hands behind head, stretch spine up, shift upper trunk towards right, shift back. Relax.

One-sided stretch on table (B): Prone, physical therapist holds left hand of patient in supination, pulls down, while patient describes swinging motion with right arm stretching up and raising head and shoulder off the table. Swing arm back. Relax.

One-sided stretch on stool (B): Patient sits on left half of buttocks, stretches right arm and right leg to full extension, leaning body slightly forward. Return to normal position. Relax.

Four-footed exercise (C): Patient on hands and knees on floor mat. Stretch right leg, swing to opposite side then stretch right arm. Swing to opposite side. Swing arm and leg back, return to position on hands and knees. Relax.

Statue exercise (B): Patient standing: locks hands behind head, drop right hip by flexing knee, stretch right elbow and shoulder upward. Return to normal standing position. Relax.

Lateral breathing (A): Patient lying on left side, hands locked behind head: breathe concentrating on right side against resisting hand pressure from physical therapist.

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3. Kraus, Hans: Therapeutic Exercises. Thomas and Thomas (in print).

Exhibits Available

Posters

1. Set of two, entitled "Physical Therapy Procedures," each containing eight black and white photographs of physical therapy activities.

2. Set of two on "Posture." Good and poor postural positions are shown, together with exercises for correction of faulty posture.

3. Poster exhibiting reprints available in the physical therapy field.

4. Album photographs of "Posture" showing corrective exercises.

5. Two posters, with color prints, the first showing "General Physical Therapy Procedures," and the second, "Detailed Early Exercise Technics."

Slides

1. Set of 38: "Physical Therapy Procedures." Title slides are included in the group.

2. "Course Content in Physical Therapy"—18 slides showing material covered in physical therapy training. Especially suitable for talks to student groups.

A script describing the slides is included with the slides.

Album

Photographs of physical therapy procedures.

The slides and procedures album may be borrowed from the National Office of the American Physiotherapy Association, 1790 Broadway, New York 19, N. Y. All other requests and correspondence regarding exhibits should be directed to Maxine Schuldt, Exhibits Chairman, 1680 Mission Street, San Francisco, California.

Walking Reeducation for Hemiplegias

June E. Handschy

The following outline is a course of treatment given to paralytics resulting from cerebral vascular accidents and cord lesions of varied diagnoses, as administered by the Physical Therapy and Corrective Physical Rehabilitation Departments at Veterans Hospital, Mountain Home, Tennessee. It is felt that the excellent results obtained through early and systematic exercises is worthy of notation. A survey of nineteen patients was taken and classified as follows:

2—Advanced multiple sclerosis (litter cases)
2—Hemiplegias resulting from gun shot wounds (1-2 year duration)
1—Hemiplegia as a result of a skull fracture
1—Total body paralysis, diagnosed as a fractured third cervical vertebra
13—Hemiplegias resulting from cerebral vascular accidents, 6 of whom were referred for treatment 3-5 weeks after onset, and classified as litter cases; 7 were of long duration (1-11 years). Of these 2 were litter cases, 2 were admitted in wheelchairs but claimed not to have strength to walk. The remaining 3 were ambulatory, possessing limping gaits, tibial and peroneal flips.

For those patients suffering from cerebral vascular accidents and recommended to physical therapy within a three to five week period after hospital admission, the following curriculum was inaugurated:

First to Tenth Day (approximately): the patients received bedside treatment consisting of sedative massage followed by mild passive motion to the involved parts.

Third to Fifth Week: If possible, the patient was placed in a wheelchair and brought to the physical therapy department, where the prescribed treatment was carried out. At this time, in addition to mild massage and passive motion, muscle reeducation and table exercises were begun. Confidence in himself and in the physical therapist was encouraged by teaching the patient the correct way to sit up, to get out of bed into a wheelchair and return, and to aid himself with the use of his unaffected hand and leg.

Sixth Week to Discharge Date: Patients were referred to Corrective Physical Rehabilitation, following treatment in physical therapy, for progressive exercise. This included crutch walking, coordination and wheelchair exercises. (All six patients admitted as litter cases were able, after 12 weeks, to walk aided only by one cane or crutch. Four were able to ascend and descend short flights of stairs.)

Treatment for the seven patients who had hemiplegia of long duration consisted of muscle reeducation and table exercises followed by general exercise as described. After three months both litter and wheelchair cases were ambulatory and also were able to ascend and descend short flights of stairs.

Figure 1.

Both cases of multiple sclerosis were given Frenkel's exercises as well as coordination activities. There has been no improvement in either case over a three month period.

Hemiplegias resulting from gun shot wounds, of a 1-2 year duration, received the following treatment: in addition to mild massage and exercise, heat in the form of infra-red irradiation was ordered. The same exercise and activity program as previously described was employed. Both cases had right arm and leg involvement. It was necessary, because of the flaccid paralysis and weakness, to fit both patients with full, double bar leg braces. After a training period of ten weeks both patients were ambulatory aided by brace and crutch.

Chief of Physical Therapy, Veterans Administration Hospital, Mountain Home, Tennessee.

The patient suffering from paralysis due to a skull fracture received the same treatment as was prescribed for the six diagnosed as early cerebral vascular accidents. This patient also is ambulatory, is able to walk short distances and negotiate short flights of stairs, after a twelve week period. His speech, however, has not returned.

Extensive bedside muscle reeducation and sinusoidal stimulation was carried out in the case of the total body paralysis as a result of a fractured cervical vertebra. After three months the patient was fitted with a Thomas collar and brought, via wheelchair, to the physical therapy department where treatment was continued. Although the patient needed considerable assistance in getting from the chair to the treatment table, it was felt that there was sufficient muscle power and coordination present to warrant mild general exercise activities in Corrective Physical Rehabilitation. For five months, twice daily, this program was administered. This patient was transferred to a paraplegic center, *completely* ambulatory, and permitted to remove his brace for short periods of time.

Conclusions drawn from clinical observation would appear to indicate that early, progressive treatment as described will benefit, in varying degrees, all types mentioned. It also is to be noted that in cases of hemiplegias of long duration remedial exercises and posture training is of worthy importance in improving walking technic.

Program Factors to be Remembered:

1. Patient's blood pressure should be closely checked.
2. Watch for signs of fatigue. Treatment should be terminated before the patient reaches a state of fatigue.
3. It is important that the physical therapist maintain a cheerful and optimistic attitude. Confidence in himself and in the physical therapist should not be allowed to diminish. He always "can," he "will walk."

The following letter, dated August 22, 1947, and referring to the above article on "Hemiplegia," was written by F. R. Eastland, M.D., Director, Veterans Administration Hospital, Mountain Home, Tennessee:

A Veterans Hospital, the type at Mountain Home, Tennessee, presents many problems in geriatrics. Prominent among these is the problem of cerebral vascular accidents with resulting prolonged periods of hospitalization and dubious end results of the usual accepted therapy.

Moreover, since V-J Day, we are confronted with the younger age group with many traumatic injuries of the central and peripheral nervous systems, the result of war injuries, and to a greater degree, those sustained since discharge by truck, motorcycle and automobile.

The staff of this hospital has followed with interest the work of Miss Handschy, Chief of Physical Therapy, and of Mr. Misenar, Chief of Corrective Physical Rehabilitation, in the early treatment and subsequent management of these types of cases.

The period of hospitalization of these patients has been materially diminished and the end results of therapy most excellent.

The Medical Staff of this hospital joins me in endorsing the physical therapy program as developed by these patients in the Department of Physical Medicine by Miss Handschy and Mr. Misenar.

A Mechanical Joint Mobilizer*

Beatrice Forman and F. H. Lewey, M.D.**

Rehabilitation of a patient who has sustained a major peripheral nerve injury is a slow process, extending over months and years. Every attempt should be made to shorten the time of his hospitalization. The first step in this procedure is the mobilization of "frozen joints" preparatory to neurosurgical intervention such as nerve suture. Immobilization of extremities in casts and splints, disuse of limbs, muscular contracture due to imbalance of paralyzed muscles or to deep fibrosis in muscle and joint were the commonest causes of "frozen joints" in our war material. Some of these factors may be avoidable under peacetime conditions. However, the frequent combination of nerve lesions with bone fractures in industrial as well as in war injuries often requires inclusion of joints in casts. Physical therapy personnel and facilities are necessarily limited even in a large Army hospital. Not more than about 20 minutes every second or third day can be devoted to the routine treatment of each of 1500 patients by a staff of 25 trained physical therapists. It seemed unreasonable to disrupt this schedule by request-

*Technical assistance given by Wilbur Fisk.

**3400 Spruce St., Philadelphia 4, Pa.
From the Neurologic-Neurosurgical Sections of Cushing General Hospital, Framingham, Mass.

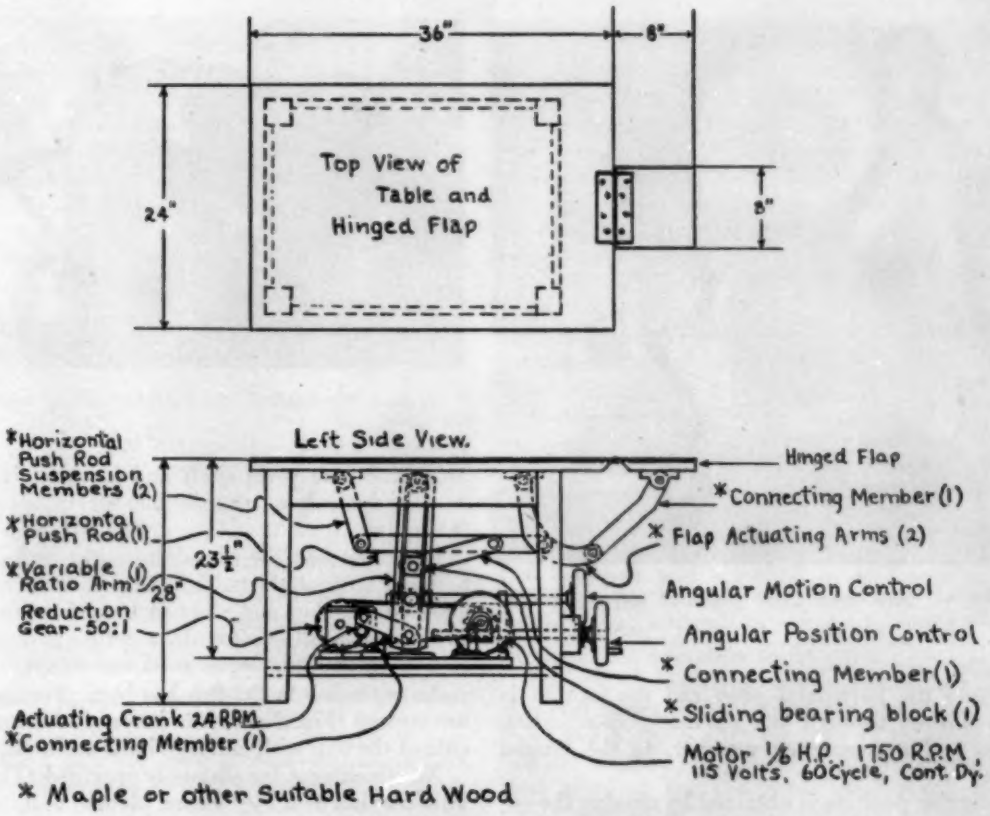

Figure 1. Worksheet for the improvised joint mobilizer. (Designed and built at Cushing General Hospital.)

ing the preferential daily handling of an additional special group of patients.

It was decided, therefore, to attach one physical therapist exclusively to the Neurologic-Neurosurgical sections. An apparatus was improvised for the accelerated mobilization of large joints. Gustaf Zander had constructed a number of "medico-mechanical" apparatus in Sweden in 1872. Their application has been discouraged in this country because it was believed that the use of power-operated mechanical methods for passively overcoming joint disfunction was contrary to orthopedic principles. A trial seemed justifiable in the emergency situation.

Description of the Joint "Bull-Dozer": The apparatus described and illustrated here has proven its worth during the eighteen months of its use in this hospital. It has been improvised and built of wood with the exception of a few standard pipes, rods and an electric motor.

The basic part of the apparatus is a board hinged to a table. It is moved mechanically up and down. The ground position of the board as well as the angle of movement are variable and independent of each other within 180 degrees whereas the frequency of movement is fixed at about 30 per minute. Two easily accessible wheels at the front of the apparatus adjust the two actions while the machine is in motion.

Worksheet for Improvising the Apparatus: (Fig. 1). The motor is belted to a standard 50 to 1 reduction gear unit. On the slow shaft of the reduction gear is a crank which turns at 24 R.P.M.; through a connecting member it oscillates a "variable ratio" arm. This motion is transmitted in the amount desired, through a connecting member, to the horizontal push rod. The amount of motion transmitted varies with the position of the sliding bearing block which slides in a slot cut in the variable ratio arm. The block is positioned by a small flexible steel cable which is fastened to it so it may be moved up or down the slot. The control cable is moved by two small drums which are mounted on the angular motion control shaft. It runs on three pulleys mounted on the variable ratio arm coming off that arm

Figure 2. Mechanical joint mobilizer set for mobilizing the knee.

axially.

From the horizontal push rod the motion is transmitted, through the curved, flap-actuating arms and a connecting member, to the hinged flap.

Angular position is obtained by moving the entire motor board (on which are mounted also the reduction gear, bearing supports for the variable ratio arm and angular motion control). This board is moved by the angular position control handwheel which turns a heavy, coarse pitch screw, captive in a 2″x4″ cross member (fastened across the front legs of the machine). The variable ratio arm pivot shaft and its support must be well braced as considerable strain occurs at this point.

Figure 3. Mechanical joint mobilizer set for mobilizing the elbow.

Provision has been made to strap limbs both to the flap and the table, using clamps on the sides of the flap and slots in the table cut in a convenient position. Two-inch cotton belting, cut to convenient lengths, is used for straps.

An extension to the flap has been provided for use on legs (Fig. 2). This is fastened to the underside of the flap with carriage bolts and wing nuts.

An attachment for elbows is provided (Fig. 3). This consists of a 7½″ board pivoted at its center and supported by brackets which clamp to the hinged flap. This, in effect, adds 90 degrees to the angular position of the flap but being pivoted it provides a surface to which the arm may be strapped without danger of pinching it against the table top.

The mechanism in its present form is useful

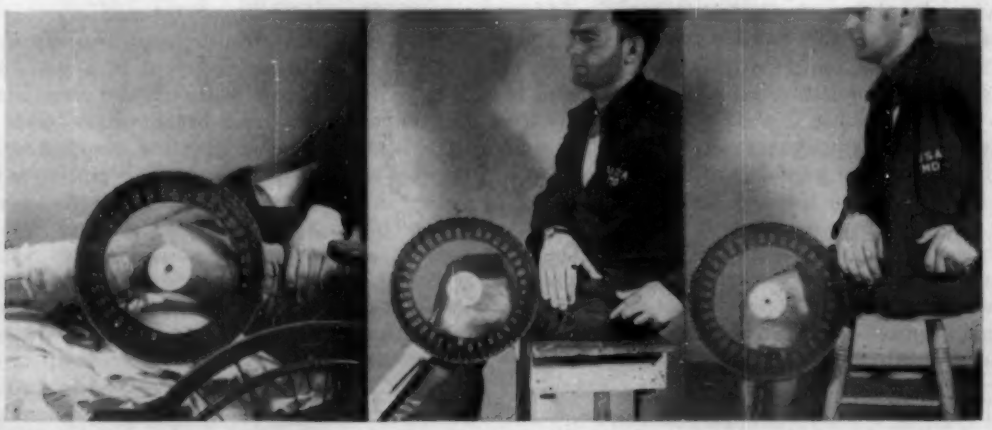

Figure 4. Sgt. A. S. Interruption of tibial and peroneal nerves. (a) Knee frozen from disuse at 165 degrees. (b) After 27 treatments on 19 days. (c) After 50 more treatments on 26 days. Total: 45 days of treatment.

for mobilizing elbow and knee.

Results. During eighteen months about 100 patients were treated on the joint mobilizer for an average of six weeks per person. Treatment, in combination with baking, infra-red irradiation and massage, lasted one and a half hours daily, usually subdivided in three sessions of 30 minutes each. The patients learned in a short time to run and adjust the apparatus themselves. Hence, one physical therapist was able to supervise several patients at a time while working on the wrist, fingers and toes of another person. An advantage of the power-driven mechanism is seen by patients and physicians in the fact that its motor runs so smoothly that the possibility of jerks with consequent muscle spasms is eliminated. The patients were willing to tolerate a wider angle of motion from the machine than from the skilled hands of a trained physical therapist. In fact, the physical therapist had to be concerned mainly with preventing the patients from overstrain. No harmful effects were observed.

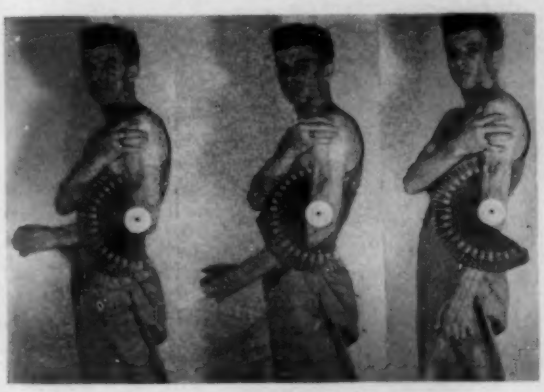

Figure 5. H. deL. Interruption of median and ulnar nerves. (a) Elbow fixed in 95 degrees after 7½ weeks in cast because of fracture of humerus. (b) After 19 treatments on 7 days. (c) After 47 treatments on 18 days. Total to 180 degrees: 34 days of treatment.

Two cases may illustrate the results: (1) Sgt. A. S. was wounded by shrapnel on November 13, 1944, about two inches above the left popliteal space, injuring both tibial and peroneal nerves. On arrival in this hospital on March 5, 1945, his knee was completely frozen at 165 degrees from disuse although he had not been in a cast at any time. After 27 treatments in 19 days the knee could be flexed to 130 degrees; and after 50 more treatments on 26 days it could be moved to the desired angle of 90 degrees (Fig. 4), permitting nerve suture after 45 days of preparation.

(2) H. deL. was wounded on October 30, 1944, by shrapnel, penetrating the left upper arm, fracturing the humerus and dividing both median and ulnar nerves. He was in a cast from November 20, 1944, to January 12, 1945. On arrival in this hospital the cast was removed and the fracture found consolidated, the elbow fixed at 95 degrees. After 19 treatments in 7 days the forearm could be flexed to 48 degrees and extended to 125 degrees. After 47 more treatments given on 18 days the forearm could be fully flexed (25 degrees) and extended to 165 degrees. In the following 9 days extension was complete (180 degrees) (Fig. 5). Thus the patient was prepared for operation in 34 days.

There is of course no way of stating how long it would have taken to obtain the same results in these two patients with the help of the orthodox manual method. However, if one compares the time required for producing similar effects by either method in different patients, a saving of about 20 to 25 per cent seems a fair estimate. It is our impression that the mechanical joint mobilizer, because of its inherent qualities, will retain its place in physical therapy in peacetime, not to replace but to supplement the manual work of the physical therapist.

SUMMARY

An improvised apparatus is described for the mobilization of "frozen" joints. There resulted a saving of not only physical therapy personnel but of the days necessary for preoperative preparation of the patient by as much as 25 per cent.

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1. Zander, Gustaf: Om medico-mechaniska Institutet in Stockholm. P. A. Norstedt & Soner. Stockholm, 1872.

CHANGE OF ADDRESS

All changes of address must be sent directly to the office of THE PHYSIOTHERAPY REVIEW, 4741 N. Paulina Street, Chicago 40, Illinois, by the 20th of the month prior to the publication date, if the next issue is to be received. Both the old and new address must be given. Since the magazine goes out as second class mail, copies are not forwarded.

Cerebral Palsy as an Educational Problem

Martin F. Palmer, Sc.D.

The present day growing enthusiasm for the solution of the problems of individuals handicapped by cerebral palsy is gratifying and yet dangerous. It is gratifying because these children have been too long neglected and it is dangerous because clinics are being started here, there, and elsewhere in this country without proper planning and without proper staffing. Inadequately trained personnel, no matter whether it be in medicine, surgery, or in any of the educative and nursing fields, can only militate eventually against this whole movement.

I. As Educational Problem

The presentation contained in this paper is aimed at the essential core of the cerebral palsy problem, which is, after all, an educational as much as a medical matter. All clinics which have accepted the heavy responsibility of dealing with cerebral palsy have been started by some individual trained in one or another specialty. Thus we have a picture of a clinic run primarily from the logopedic point of view, etc. No clinic in this field can be completely successful unless the very highest skills are available in the various specialties which are involved in the solution of this distressing problem. Thus, the best clinic, achieving the best results, will be that clinic which has the most highly skilled physical therapist, the most highly skilled vocational therapist, the most highly skilled logopedist, and, perhaps not least of all, the most highly skilled public school teacher.

In the historical development of the prominent clinics of this country in this field, each of these specialists, in turn, has realized the necessity gradually of bringing into the picture the knowledge available only in other specialties of science. Thus, the pediatrician has had to rely on the physical therapist, on the neurologist, on the logopedist, on the educator for knowledge which cannot be obtained in the one specialty of pediatrics. The logopedist, on the other hand, has had to reply on the other specialties more and more as his clinical development gained momentum. It is safe to say, in these introductory remarks, that no single specialist and no single specialty can possibly know all there is to know about cerebral palsy. In the mind of the pediatrician, cerebral palsy is a medical problem primarily pediatric in nature because it begins in childhood and many of the distressing complications are childhood phenomena which must be taken care of before adulthood is reached. In the eyes of the neurologist many of the distressing phenomena are neurological resulting from injuries to the nervous system of one sort or another which must be taken care of from a neurological point of view and thus cerebral palsy becomes a neurological problem. From the standpoint of the physical therapist, the problem is one of poor coordination of muscles which must be corrected insofar as possible by the application of the most highly skilled physical therapy technics. In the eyes of the logopedist, the problem is primarily one of speech because it is, in effect, a speech disorder as well as a general motor disorder.

Director, Institute of Logopedics, Wichita, Kansas
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THE PHYSIOTHERAPY REVIEW—Change in Price

Effective May 1, 1947, the price of a year's subscription to THE PHYSIOTHERAPY REVIEW was raised to $4.00 in the United States; $4.50 outside the United States. Single copies are now 75c. Send your subscription to THE PHYSIOTHERAPY REVIEW, 4741 North Paulina Street, Chicago 40, Ill. Changes in address also should be sent to this office.

Schools Approved for Training Physical Therapists

By Council on Medical Education and Hospitals of the American Medical Association

Name and Location of School	Medical Director	Technical Director	Entrance Requirements*	Length in Months	Classes Start	Tuition	Certificate, Degree, Diploma
Children's Hospital, Los Angeles[1]	Samuel S. Mathews	Sarah S. Rogers	a-b-d	14	Sept	$200	Cert. or Degree
College of Medical Evangelists, Los Angeles[1]	F. B. Moor	A. H. Carlson	a-b-c-d	12	Sept	$225	Cert. or Degree
University of Southern California, Los Angeles	O. L. Huddleston	Charlotte W. Anderson	a-b-d[2]	12	Sept	$496	Cert. or Degree
University of California Medical School, San Francisco[1]	Frances Baker	Margery Wagner	d-e	12	Sept	$220[4]	Cert. or Degree
Stanford University, Stanford University, Calif.[1]	Wm. Northway	Lucille Daniels	a-b-d[2]	12	Jan June	$523.30	Cert. or Degree
Northwestern University Medical School, Chicago	John S. Coulter	Gertrude Beard	a-b-d	12	Oct	$300	Certificate
State University of Iowa Medical School, Iowa City	W. D. Paul	Olive C. Farr	e	12	Sept	$299	Certificate
University of Kansas School of Medicine, Kansas City, Kans.	Donald L. Rose	Lilyan G. Warner & Ruth Monteith	a-b-c[3]	12	FebSept	$80[4]	Cert. or Degree
Bouve-Boston School of Physical Education, Boston	Howard Moore	Constance K. Greene	H.S.	36	Sept	$500 yr.	Degree
Boston University College of Physical Education for Women: Sargent College, Cambridge 38, Mass.	Kenneth Christophe	Adelaide McGarrett	H.S.	36	Sept	$435 yr.	Cert. or Degree
University of Minnesota, Minneapolis[1]	Miland E. Knapp	Ruby M. Green	H.S.	36	Oct	$530[4]	Degree
Mayo Clinic, Rochester, Minn.	Frank H. Krusen	Ruth Ryan	a-b-c	12	Jan July	None	Certificate
Barnes Hospital, St. Louis	F. H. Ewerhardt	Beatrice F. Schulz	a-b-d	12	Sept	$200	Certificate
St. Louis University School of Nursing, St Louis[1]	Alexander J. Kotkis	Sr. Mary Imelda	H.S.	36	Jan Sept	$300	Degree
Albany Hospital, Albany, N. Y.	John W. Ghormley	Catherine Graham	a-b-c	12	Sept	$200	Certificate
Columbia University, New York City	Wm. B. Snow	JosephineL. Rathbone	a-b-c	1 or 2 yrs	Sept	$450 yr.	Cert. or Degree
New York University School of Education, New York City[1]	George G. Deaver	Elizabeth C. Addoms	a-b-d	12	Sept	$525	Cert. or Degree
Duke University School of Medicine, Durham, N. C.[1]	Lenox Baker	Helen Kaiser	a-b-d	15	Oct	$300	Certificate
D. T. Watson School of Physical Therapy, Leetsdale, Pa.[1]	Jessie Wright	Kathryn Kelley	a-b-d	12	Oct	$300	Diploma
Graduate Hospital of the University of Pennsylvania, Philadelphia, Pa.[1]	George M. Piersol	Dorothy Baethke	a-b-e	12	Sept	$300	Certificate
University of Texas School of Medicine, Galveston	G. W. N. Eggers	Ruby Decker	a-b-d	12	Jan	$143[4]	Certificate
Baruch Center of Physical Medicine of the Medical College of Virginia, Richmond, Va.[1]	Frances Hellebrandt	Edith M. Vail	a-b-c[3]	12	Sept	$262[4]	Cert. or Degree
University of Wisconsin Medical School, Madison[1]	Harry D. Bouman	Margaret Kohli	a-b-c[3]	12	Sept	$96[4]	Cert. or Degree

*Courses are so arranged that any of the entrance requirements will qualify students for training. a = Graduation from accredited school of nursing; b = Graduation from accredited school of physical education; c = Two years of college with science courses; d = Three years of college with science courses; e = Four years of college; H.S. = High school graduation.

[1] Male students are admitted.

[2] High school graduates accepted for a four-year course leading to A.B. degree.

[3] High school graduates accepted for four-year college course.

[4] Nonresidents charged additional fee.

Editorials and News

Vocational Guidance

The need for a constant and continuous vocational guidance program by the chapters is most important if we are to meet personnel demands. The expected enrollment of the approved schools this year is approximately 500. During the war years the number of new graduates was between 700 and 800. The Association has reached the age where each year we will lose by death or retirement an increasing number of members. In the younger age group we lose them to marriage and a few to other professions. Our annual attrition rate has been set at 8 to 10 per cent of our active membership. This means that this year we may expect to lose 360 physical therapists from active service in the field. Our net gain therefore would be less than 200.

It is considered that by 1960 we should have a minimum of 15,000 physical therapists in active employment. This figure was arrived at after careful study of reports of the Crippled Children's Division on the numbers of crippled children in the United States and Federal Security Agency reports on the number of individuals injured each year. We will need to have an increased number of students in school every year if we are to provide adequate personnel for all these needing physical therapy to assist them to attain maximum recovery and to be useful employable citizens.

The competition among the professions is keen. We will have personnel in your community only if every chapter and every member works at it. Organize and maintain a vigorous vocational guidance program in your area. The National Office will provide you with printed material for distribution. Slides are available illustrating physical therapy procedures. Talk to parent groups as well as to the students themselves. Your educational chairman will assist you in organizing your program. Let us be sure that every school is filled to capacity next fall.

—MILDRED ELSON

Physical Therapy Employment

At the present time the opportunities for physical therapy employment are great. In fact the need is so great that many employees are raising salaries and offering additional inducements to obtain personnel. This always creates unrest in present employment and the "grass looks greener" in another position. Some physical therapists have left employment without adequate notice or without discussing future opportunities with their present employers.

This is not good for the individual or for the profession. It is recognized that circumstances alter the case but adequate notice always must be given. A review of current opportunities and discussion of them with the present employer may result in increased opportunities as well as greater security in employment.

Development of "The Physiotherapy Review"

The editorial board is desirous of producing an interesting publication and one which will be of service to the members of the American Physiotherapy Association. During recent months many new ideas for development have been considered and discussed and a few have been initiated. Chapter presidents have been asked to present some of our plans to their groups in order to acquaint you with them. It is our earnest hope that you will give us the benefit of your suggestions and criticisms. The growth and expansion of the REVIEW is largely dependent upon the interest and contributions of our membership.

A.P.A. Exhibit

The A. P. A. again participated in the educational exhibit of the annual meeting of the American Hospital Association held in St. Louis, September 22-26. The new Association exhibit was shown for the first time and received many favorable comments. A photograph will be taken and will be in a later issue of the REVIEW. Members of the Missouri Chapter assisted at the exhibit.

The exhibit will be shown again at the winter meeting of the American Medical Association which will be held in Cleveland, January 5-8,

1948, and at the American Academy of Orthopedic Surgeons in Chicago, January 25-29, 1948.

The October issue of the AMERICAN JOURNAL OF OCCUPATIONAL THERAPY has an article on physical therapy by Mildred Elson.

New Chapters

Two new chapters have been added recently to the American Physiotherapy Association—Alabama and Puerto Rico.

Colorado Chapter

The Colorado Chapter exhibited at a recent meeting of the Colorado State Medical Society. The exhibit received first prize for its originality.

Illinois Chapter

Dr. H. Worley Kendell, Director of Physical Medicine, University of Illinois, and newly elected president of the American Congress of Physical Medicine, spoke on "The Role of the Physiatrist in Physical Medicine" at the October meeting of the Illinois Chapter. The Physical Therapy and Occupational Therapy Departments at the University of Illinois Hospital were open for observation prior to the meeting.

Physical Therapy Consultants

Catherine Worthingham, Helen Kaiser and Mildred Elson were recently appointed as consultants in physical therapy by the Veterans Administration. A meeting of the consultants was held in Washington, D. C., on September 8, 1947.

Mildred Elson, Executive Secretary, spoke to the Medical Record Librarians at their annual convention in New York on "Methods of Organization of State Chapters."

Helen J. Ream

We have just been informed that Helen J. Ream, a member of the American Physiotherapy Association since October 1945, died on August 16, 1946, following a tonsillectomy.

About People You Know

The many friends of *Louise Barnhart* who had a cord injury in an automobile accident eight years ago will be pleased to know that she is up and about on crutches. She has been a patient of Dr. Jessie Wright who informs us she is assisting in the care of other patients.

Louise has maintained an active interest in physical therapy and in 1942 sent an exhibit to the Geneva Conference.

Corrections

We wish to correct two errors which occurred in the September-October 1947 issue of the REVIEW.

(1) It should have been noted that the article entitled "Analysis of Normal and Scoliotic Spine: With Implications for Therapeutic Exercise" by Irene Tarr was part of a Master's thesis for Stanford University.

(2) In the article on "Rapid Relaxation" by Mabel L. Fitzhugh the legend for Figure 2 should read: "Exhale through mouth as in a deep sigh while relaxing all over."

American Congress of Physical Medicine Meeting

The annual meeting of the Congress was held in Minneapolis, September 2-6. Many physical therapists were in attendance at both the instructional and scientific sessions.

Dr. Worley Kendell, Professor of Physical Medicine of the University of Illinois, was inducted as president for the coming year. Dr. Kendell in his presidential address stressed the importance of coordination of occupational and physical therapy services in the care of the patient.

In the Educational Section various aspects of physical therapy education were discussed. A joint educational committee composed of members from the American Physiotherapy Association, American Occupational Therapy Association and the Congress of Physical Medicine is being formed to further implement advances in education.

Visitors from Chartered Society of Physiotherapists

Mrs. Helen Heardman, a member of the Chartered Society's Council and Chairman of its Examinations Committee, arrived in New York October 4th. Mrs. Heardman is an official representative of the Chartered Society of Physiotherapists. She has taught in physical therapy schools and more recently has been doing work with Natural Child Birth. She has been associated with Dr. Dick Reid who was in the United States

recently lecturing on his work.

Mrs. Heardman is the guest of Miss Josephine Rathbone. She has given lectures to Columbia University physical therapy students as well as to nurses and physicians.

Mr. F. S. Hebb, a member of the Chartered Society, recently visited the national office. Mr. Hebb worked with Dr. Lee Baron during the war and was anticipating visiting American physical therapy departments in Boston, Chicago, Rochester and Philadelphia.

Doctor Mennell at University of Southern California

Dr. James B. Mennell has been appointed as Assistant Professor of Physical Medicine at the University of Southern California for the coming year.

Doctors Covalt at New York University

Dr. Donald Covalt has been appointed as Associate Professor in Physical Medicine at New York University. Dr. Nila Covalt also is to be associated with New York University as Assistant Professor in Physical Medicine.

The Doctors Covalt have made an outstanding contribution to the field of physical medicine and rehabilitation through their work at the Veterans Administration. In the two years since V-J Day the development of a total physical rehabilitation program in the VA has been little short of phenomenal. Their enthusiasm and abilities will be greatly missed in the Veterans Administration, but they will be carrying on equally important work at New York University.

Scholarships for Cerebral Palsy Study

Opportunities are offered physical therapists to learn specialized treatment of patients with cerebral palsy. Scholarships totaling $5000 a year have been given the Cerebral Palsy Division of the National Society for Crippled Children and Adults by the national council of Alpha Chi Omega, national women's fraternity. The allotment will cover maintenance and tuition for study at a recognized training center for a minimum of three months.

American Academy for Cerebral Palsy

An action was taken the latter part of January 1947 by a group of medical men who serve the National Society for Crippled Children and Adults as a medical advisory council in its national cerebral palsy program which should interest our readers. This advisory council is composed of Dr. Earl Carlson of Long Island, N. Y., and Pompano, Fla.; Dr. Bronson Crothers of Boston; Dr. George Deaver of New York; Dr. Temple Fay of Philadelphia; Dr. Meyer Perlstein of Chicago and Dr. Winthrop M. Phelps of Baltimore.

At a meeting in Chicago at the time of the American Academy of Orthopedic Surgeons, this group voted to organize an American Academy for Cerebral Palsy, with those present constituting the charter members. This action was taken because there is currently a tremendous interest in the cerebral palsied and a demand for services which are nonexistent. Trained personnel is desperately needed, and at present there are no standards for the training of such personnel.

Warm Springs Foundation:

Twentieth Anniversary

A clinical conference on "Anterior Poliomyelitis" was held at the Warm Springs Foundation, September 15-18. Lucille Daniels presented the physical therapist and her coworkers. All professional groups working with the poliomyelitis patient were represented. The speakers emphasized the importance of the physician and his team working coordinately for the welfare of the patient. One session was devoted to the discussion of advances in research.

Doctor Ward who had an article in the July-August issue of the REVIEW was one of the principal speakers. Warm Springs Foundation has grown steadily and now has a patient load of 182. It has become necessary to enlarge the physical therapy department and this past year a Department of Remedial Activities was added.

Dr. Maurice Fishbein in his address congratulated the National Foundation and Warm Springs Foundation for their great contribution to medicine through their excellent and sound medical programs.

Attending the conference were physicians from all over the country who have contributed to the advances made in the research and medical care of infantile paralysis. Among the physical therapists present were Sue Roen, Catherine Worthingham, Lucille Daniels, Marian Williams, Jessie Stevenson, Ruby Decker, Helen Kaiser, Margaret Moore, Dorothy Devendorf, Winifred Roby, A.

Garman Dingwall, John Untereker, Theresa Tanner and Mildred Elson.

Poliomyelitis Epidemic Aid Team

The National Foundation for Infantile Paralysis has announced that a poliomyelitis epidemic aid team with a consignment of special equipment used in fighting outbreaks of the disease was flown to Lt. Gen. Lucius D. Clay, commanding U. S. forces occupying Germany, during the month of September. This assistance was offered in line with National Foundation policy to aid "the armed forces of the U. S. anywhere in the world where troops or their dependents may be exposed to the threat of infantile paralysis epidemics." While at that time no U. S. Army personnel was involved, the disease, nevertheless, was reaching epidemic proportions in Berlin.

The epidemic aid unit was recruited from Children's Hospital in Boston and consisted of Dr. Thomas Gucker, orthopedic surgeon, Mrs. Elizabeth Zausmer, physical therapist, and Miss Anna Fallon, registered nurse.

Infantile Paralysis Course Repeated

In June 1947 the Medical School at the University of Wisconsin gave a week's intensive course in the "Diagnosis and Therapy of Poliomyelitis." This course was given at the Medical School and the State of Wisconsin General Hospital as well as the Orthopedic Hospital in cooperation with the county chapters of the National Foundation for Infantile Paralysis throughout Wisconsin. Thirty-three physicians attended the course during its first offering, and there was such a demand for it that the course was repeated during July.

Benefit Shoe Foundation

The recently organized Benefit Shoe Foundation, Bristol, R. I., is a nonprofit corporation offering single shoes and odd pairs at cost for amputees, paraplegics and others with mismated feet. First of its kind in the history of footwear, the project will not attempt to provide orthopedic or special shoes of any kind but will simply make available regular standard make shoes—singly or in mismated pairs.

The Benefit Shoe Foundation was started at the suggestion of the National Foundation for Infantile Paralysis and is under the direction of Dr. Dale D. Dutton, a former Baptist minister. Doctor Dutton estimates that there are nearly half a million adults in the United States—amputees and persons with mismated feet—who can be served by his project. Many poliomyelitis patients with residual paralysis in one foot require an orthopedic shoe, which usually is made to order, and a standard shoe which normally comes only in pairs. A folder showing styles, sizes and prices will be sent upon request.

Inspiration for the project was Miss Ruth Rubin of St. Louis who for the past two years has conducted a "shoe exchange" through which amputees, paralytics and others traded their odd shoes.

New Members

The following are newly accepted members of the American Physiotherapy Association:

Blaustein, Jack, 215 W. 98th St., New York, N. Y.
Bossa, Mrs. Betty Mae, 1065 N. San Antonio, Pomona, Calif.
Crain, Jessie M., 4137 Lindell, St. Louis 8, Mo.
Curry, Margaret L., 55 Lincoln Ave., Johnson City, N. Y.
Hawkins, J. Gordon, 715 S. 44th St., Louisville, Ky.
Joseph, Mary B., 40 Edgar Ave., Dayton 10, O.
Koster, Helen Marie, 3082 N. E. Regent's Drive, Portland 12, Ore.
Lovinger, Louise, 1808 New Jersey St., Los Angeles 38, Calif.
McWilliams, Alice I., 234 E. 23rd St., New York 10, N.Y.
Richtarsic, Agnes, 83 Hodge Ave., Buffalo 9, N. Y.
Segar, Mrs. Carol C., 854 Locust Ave., Charlottesville, Va.
Snelling, Ruth F., Millettville, S. C.
Williams, Ralph V., 417½ Third St. S. W., Rochester, Minn.

Associate Members

Bouman, Harry, M.D., Wisconsin Gen. Hosp., Madison, Wis.
Rose, Donald M., M.D., Univ. of Kansas Med. Center, Kansas City, Kans.
Stilwell, Catherine F., Ph.D., 970 University Ave., Palo Alto, Calif.
Strnad, Mrs. Beryl, Bureau for Handicapped Children, Madison, Wis.

Recent Graduates of Univ. of Southern Calif., Los Angeles, Calif.:

Freesen, Ann J.
Helgestad, Marion E.
Henderson, Mary Jane
Hjelte, Jean
Hoag, Marjorie N.
Normoyle, Margaret J.
Priest, Marjorie
Teesdale, Lois R.

Recent Graduates of Univ. of Calif. Medical School, San Francisco, Calif.:

Brown, Helen J.
Gardipee, Margaret A.
Johnson, Barbara J.
Kispert, Rose Marie
Lewter, H. Inez
Meyer, Norma A.
Miles, Marion L.
Watson, Mary Jane
Welch, Thomas D.
Wilkie, Lorine R.
Wilkinson, Diana G.

Recent Graduates of Northwestern Univ. Medical School, Chicago, Ill.:

Barre, Marjorie S.
Cuthbertson, Jean
Farwell, Mrs. Helen K.
McBratney, Joan C.
Oechsner, Marie
Pettyjohn, Phyllis J.
Romandi, Jennie
Valiknac, Mrs. Ethel Haney

Recent Graduates of D. T. Watson School of Physical Therapy, Leetsdale, Pa.:

Allen, Betty
Beaver, Elsbeth
Berlinger, Bertha
Borden, Barbara
Chagnot, Alice
DiGennaro, Anthony
Downer, Ann
Fitzsimmons, Walter
Fleming, Betty
Glaubman, Gloria
Goodman, Ruth G.
Hegarty, Mary Georgia
Hunter, Clara
Leventry, Joan L.
Locke, Velma
Mitchell, Mildred
Patton, Catherine
Reinhold, Ruth
Schreiber, Edna
Sekerak, Irene
Shaw, Janet
Shulver, Pearl B.
Ward, Lola
Whalen, William
Wood, Elizabeth L.
Wynn, Ellen J.
Zbikowska, Chessie

Recent Graduates of Graduate Hospital School of P.T., Univ. of Penna., Philadelphia, Pa.:

Angelotti, Marie E.
Bezilla, Helen T.
Ciavarella, Daniel C.
Davison, Ruth A.
Dryden, James M.
Flavin, Edith M.
Gibson, John H.
Groff, Mrs. Miriam B.
Jennings, Mary Anne
Jones, Herbert H.
Macavoy, Charles G., Jr.
Rivell, Emma M.
Schlotfelt, Luella D.
Smith, Frances C.
Sonner, Ruth E.

Recent Graduates of University of Wisconsin Med. School, Madison, Wis.:

Brugger, Mrs. Marjorie A.
Bryce, Margaret
Burdon, Mrs. Ruth J.
Disbrow, Mary E.
Field, Mrs. Bertha H.
Fishbain, Charlotte
Harris, Mrs. Ada E.
Kersten, Sonja J.
King, Molly M.
Lehman, Violet
Schuette, Doris M.
Sunny, Marion E.
Thomas, Chester C.
Vignola, Marie A.

Women's Medical Specialist Corps

Brigadier General George E. Armstrong, Acting Surgeon General of the Army, announces that the President of the United States has tendered recess appointments in the Women's Medical Specialist Corps, Regular Army, to the following physical therapists whose names appear on the first list of appointees in this new corps.

Public Law 36, 80th Congress, April 16, 1947, authorizes the establishment of a Women's Medical Specialist Corps to be comprised of a Dietitian Section, a Physical Therapist Section, and an Occupational Therapist Section. Officers in this corps enjoy all the benefits and privileges which are applicable to male commissioned officers of the Regular Army.

In order that all physical therapists who had previous military service in the Army may be assured of an opportunity to apply for integration in this corps, the Department of the Army has recently announced that the deadline date for submission of applications has been extended to November 30, 1947.

Name	*Military Address*
Bates, Myrtle M., 1st Lt.	147th Gen. Hosp., APO 958, San Francisco, Calif.
Baylies, Marie H., 1st Lt.	Station Hospital, Ft. Myer, Va.
Ben Dure, Mary L., Capt.	97th Gen. Hosp., APO 757, c/o P.M., New York, N. Y.
Binning, Marcel, 1st Lt.	147th Gen. Hosp., APO 958, San Francisco, Calif.
Bundt, Francine B., 2nd Lt.	European Command
Christman, Louise D., Capt.	147th Gen. Hosp., APO 958, c/o P.M., San Francisco, Cal.
Clark, Felie W., Capt.	Hdqtrs., 8th Army, FEC, APO 343, c/o P.M. San Francisco, Calif.
Desmond, Isabelle M., Capt.	Station Hospital, Fort Knox, Ky.
Fairbanks, Emily, Capt.	Madigan Gen. Hosp., Tacoma, Washington
Harlan, Betty A., 1st Lt.	Oliver Gen. Hosp. Augusta, Ga.
Harr, Emma T., Capt.	Percy Jones Gen. Hosp., Battle Creek, Mich.
Lawrence, Dorothea M., Capt.	Valley Forge Gen. Hosp., Phoenixville, Pa.
Lee, Harriet S., Capt.	Office of The Surgeon General, U. S. Army
Mahoney, Margaret E., 1st Lt.	Oliver Gen. Hosp. Augusta, Ga.
Moffitt, Inez, 1st Lt.	Percy Jones Gen. Hosp., Battle Creek, Michigan
Renfrow, Imogene, 1st Lt.	European Command
Robertson, Barbara M., Capt.	Oliver Gen. Hosp., Augusta, Ga.
Snyder, Agnes P., Capt.	Office of The Surgeon General, U. S. Army
Vogel, Emma E., Maj.	Office of The Surgeon General, U. S. Army

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ABSTRACTS

John S. Coulter, M.D.

Rate of Regeneration of Motor Fibers in the Ulnar and Sciatic Nerves

Sydney Sunderland, M.D., D.Sc., Melbourne, Australia. In ARCHIVES OF NEUROLOGY AND PSYCHIATRY, 58:1:7, July 1947.

In a previous paper a method for estimating the rate of growth of functionally mature motor fibers in human peripheral nerves was reported, together with clinical observations on the course and rate of regeneration after lesions of the radial nerve. In the present paper, which deals with the rate of advance of motor fibers after lesions of the ulnar and sciatic nerves, the investigation was conducted as for the radial nerve, and reference should be made to the original paper for a detailed account of the method employed to calculate the rate and the criteria adopted in selecting the clinical material.

Summary

An investigation of the rate of functional regeneration of motor fibers following interruption of conduction in the ulnar and sciatic nerves provided the following results:

1. For the terminal section of the ulnar nerve in the hand, the rate of growth was 0.6 mm. per day after axonotmesis and 0.4 mm. per day after suture.
2. For the section of the sciatic nerve just below the knee, the rate of growth after axonotmesis diminished from 2 to 1 mm. per day.

Observations on Early Postoperative Rising

Thomas F. Keyes, M.D., Marysville, California. In AMERICAN JOURNAL OF SURGERY, 74:2:192, August 1947.

There has been a trend sweeping the country during the past few years for surgeons to let their surgical patients up from bed early. The author would like to give here his own clinical observations over a five-year period.

During the past five years the writer has allowed the majority of his postoperative surgical patients to rise early, i.e., on the first or second postoperative day. This procedure was actually started by the patients themselves in a county hospital when they got up of their own accord. The author observed that those patients who did so got along much better and had a much smoother postoperative course than those patients who remained in bed during their entire hospital stay.

Summary

1. Early postoperative rising is of great advantage to the early recovery of the patient.
2. Early rising leads to a lower incidence of embolism.
3. It reduces the number of days in the hospital for those who stress an economic viewpoint.
4. Suture material, in the author's experience, actually does not make any difference in the closure and in getting the patient up, whether cotton or catgut is used.
5. There is no greater incidence of hernia as a result of early rising.

The Kenny Method

Editorial. In BRITISH MEDICAL JOURNAL, No. 4517:182, August 2, 1947.

With the present widespread incidence of poliomyelitis attention is once more drawn to the method of treatment advocated by Miss Kenny—a method which incidentally has led her to formulate new and unusual theories of causation. Before the war the London County Council gave Miss Kenny facilities for a twelve-months trial of her method at the Queen Mary Hospital, Carshalton, and a report of this was published at the time in this Journal.

The committee criticized many of Miss Kenny's statements and concluded that (1) "There is no evidence that the Kenny treatment prevents or decreases the amount of paralysis . . ."; (2) "In several cases seen by us the paralysis progressed after the Kenny treatment was instituted"; (3) "While the committee disapproves of, and condemns, the wide publicity which has misled the public and many members of the medical profession, it acknowledges that this has stimulated the medical profession to reevaluate known methods of treatment of this disease and to treat it more effectively."

The Present Concept of Treatment of Poliomyelitis

Earl C. Elkins, M.D., and K. G. Wakim, M.D., Rochester, Minn. In JOURNAL OF THE IOWA STATE MEDICAL SOCIETY, 37:8:356, August 1947.

Treatment

For the past thirty years the main feature in the treatment of poliomyelitis has been considered to be the re-education and training of weak and paralyzed muscles. This was done by some workers as soon as pain and soreness of the muscles had ceased, by others after longer periods of immobilization. Nearly all workers used some form of heat. Moist heat, radiant heat and warm baths were used through the years. The reeducation varied from that used at present mainly in that it was not done as extensively and greater attention was given to prevention of fatigue. If the experimental studies on denervated muscles are correct the great emphasis placed on the prevention of muscular fatigue after the acute stage of the disease may not be the important element. The clinical results tend to indicate that prolonged immobilization was not rational. Likewise stretching the muscles in the early stages of the disease apparently is not as dangerous as was believed although strenuous stretching of contracted muscles of old poliomyelitic patients may be dangerous. The use of hydrotherapy in the form of therapeutic pools still remains an important adjunct in the treatment of poliomyelitis when properly supervised.

It was emphasized that in the care of bulbar poliomyelitis, the crucial problem is the prevention of anoxia, the susceptibility of brain tissue to anoxia being common knowledge. Therefore, severe bulbar poliomyelitis implies encephalitis involving the brain stem and it would seem logical to maintain a continuous supply of oxygen. The treatment administered was based on the correction or prevention of anoxia due to one of several factors: (1) an impaired central respiratory mechanism with resultant inadequate oxygenation due to periodic or complete apnea; (2) an impaired peripheral respiratory mechanism (paralysis of respiratory musculature); (3) the repeated aspiration of small amounts of mucus with production of numerous small regions of obstructive atelectasis, plugging of large bronchi by mucus or food particles, accumulation of mucus in the oropharynx with consequent mechanical obstruction, paralysis of the vocal cords with obstruction of airways or reflex closure of the glottis; (4) pulmonary edema with consequent decrease of alveolar absorptive surface. Combating these factors was the basis for these workers using aspiration, administering oxygen, performing tracheotomy and using the respirator.

There seems to be a general consensus that the use of hot packs does relieve the pain and discomfort of acute poliomyelitis.

It has been fairly well established that passive stretching exercise, preferably done following whatever thermotherapy is given, is very important. Whereas stretching of tight muscles was not generally considered part of the treatment in the early stages of the disease a few years ago, it is now used in varying degrees by nearly all workers. Passive stretching exercise must be done carefully, but it can be used from the early stage of the disease. As the pain subsides it can be continued until the muscle tends to remain supple and full length. After the painful stage of the disease has passed, careful stretching of the muscles apparently can be done rather strenuously without danger of injury.

Treatment of Fractures of Metatarsals and Phalanges

Lee Roy Byrd, Jr., M.D., Assoc. Med. Director, Texas Refineries Div., Gulf Oil Corp., Port Arthur, Texas. In INDUSTRIAL MEDICINE, 16:7:339, July 1947.

In the treatment of fractures in general, or of the foot in particular, fracture of the metatarsals and the phalanges of the toes is very frequently encountered.

This applies particularly to industrial injuries and is a fracture giving disability out of proportion to its usual severity and extent.

Although there is no intention of entering into the controversial subject of the underlying cause of the bone atrophy (often called disuse atrophy) to be seen in the bones of a part immobilized for treatment of a fracture, it is very interesting to observe that in none of these seven cases treated for simple or comminuted nondisplaced fractures of the metatarsals was any decrease in density of the bones of the foot in general noted.

This manner of treatment has been applied to one case in which the injury was severe contusion of the foot associated with compound displaced fracture of the 2nd and 3rd metatarsals. Debridement and reduction of the fractures under direct vision was accomplished and the wound allowed to heal from the bottom outward. The foot was immobilized by a posterior plaster splint and no weight bearing was allowed until healing of the wound was complete.

At three months after injury wound healing was complete, but x-ray examination showed marked bone atrophy in all the bones of the foot and no evidence of healing of the fractures. At this time active exercise of the foot in hot water was started. Three weeks later it was possible for the patient to begin weight bearing on the injured foot using the shoe cleat and metal insole with the aid of crutches.

At six and a half months the patient was able to return to selected work on an eight-hour shift basis, although he was still wearing the shoe cleat and insole. X-ray examination at this time showed some improvement in the bone atrophy; but no evidence of bone healing.

At eight months x-ray examination showed some callus formation at the fracture sites, and at 10 months following injury the callus was sufficiently dense to allow removal of the shoe cleat and the beginning of weight bearing with only the metal insole in place. Also at this time exercises to build up the plantar muscles were intensified.

At eleven and a half months the x-ray examination showed firm body union of all fragments and good density of all the bones of the foot. At this time removal from use of the insole was started. At 14 months the patient had progressed to the point of bearing weight on the injured foot without support other than his ordinary shoe for three to four hours with only moderate swelling and aching at the end of that time.

Thus, a patient with a severe crush injury of the foot associated with compound fracture of the metatarsals was returned to work in six and a half months, his fractures were healed in eleven and a half months, rehabilitation of the injured foot was well started in 14 months, and there was an expectation of complete rehabilitation of the injured foot with a minimum of residual disability within 18 to 20 months of the time of injury. This is a far cry from the picture, as not infrequently seen with this type of foot injury of a period of 18 months to two years before the fractures are healed and weight bearing is even started.

Frostbite: Experimental and Clinical Observations

Carl A. Johnson, M.D., Chicago. In ARCHIVES OF PHYSICAL MEDICINE, 28:6:351, June 1947.

In the second World War personnel engaged in high altitude flying encountered changes in environmental temperatures from a range of +15 to +20 C. to a range of −45 to −60 C. Other personnel were stationed in areas where the temperature stayed between −45 and −60 C. for long periods. In spite of improved equipment and clothing and an educational program, frostbite occurred with sufficient frequency to present a considerable problem.

This article is a report on experimental frostbite in monkeys, on clinical frostbite of the hands in man and on treatment of frostbite in man and monkeys.

Summary and Conclusions

This study is incomplete, and one hesitates to draw any definite conclusions. However, the experiments indicate that clotting of the blood did not occur until four to five hours after frostbite. Further studies on monkeys was recently carried out by Lange and Loew, using a different method. Their work also suggests that heparin may be useful in the early treatment of frostbite.

A study of experimental frostbite in human subjects with some anticoagulant, such as heparin, are indicated. It is conceivable that patency of a sufficient number of vessels might be maintained to save some tissue from gangrene.

The rapid recovery of monkeys from frostbite and subsequent gangrene may be attributed to immediate active use of the affected parts. On the other hand, the slow healing in the reported case may be attributed to lack of use of the affected parts. It is recommended that physical therapy be started early even in the presence of pain and open lesions.

The Effect of the Presence of Metals in Tissues Subjected to Diathermy Treatment

K. S. Lion, D.Eng., Cambridge, Mass. In ARCHIVES OF PHYSICAL MEDICINE, 28:6:345, June 1947.

It was observed in the earlier stages of the development of short wave therapy that metal particles, like rings, safety pins or buttons, on the surface of a patient under treatment might cause overheating or even burns. It is, therefore, a general rule to remove these metallic objects before a treatment. Very little is known, however, about whether metallic particles within the body, like broken needles, bullets or other objects, also will cause similar phenomena. Only Kowarschik reported that metal wires within the tissue may become heated if oriented parallel to the direction of the applied field. On the other hand, it is known that the metallic fillings of the teeth have not caused any serious difficulties in the treatment. It has been suspected that the presence of implanted surgical metals may cause severe danger if the body is subjected to a short wave diathermy treatment.

There are two possibilities of heat damage resulting from the effect of short wave diathermy on implanted metals. First, the metal may be heated to such a degree that it can damage the contiguous tissue. Such an effect is to be expected only by treatment with the magnetic field (coil method) at comparatively low frequencies. The other possibility of danger may arise in electric fields (plate, cuff electrodes) where the presence of metal can lead to a field of deformation and, therefore, a concentration of energy in the tissue adjacent to the metal.

It is difficult to predict the order of magnitude of these effects, since the geometric field distribution, the heat transfer characteristics of the materials involved and the influence of the blood circulation can be estimated to a limited extent only. The experimental approach seems, therefore, indicated. In the preceding paper, Etter, Gersh and Pudenz have done such work, with electric shortwave fields on animals, while this paper deals with similar experiments on models. This simplification in models has the advantage that the influence of different parameters can be studied in greater detail, while it is a distinct advantage of Etter, Gersh, and Pudenz's approach that the over-all picture and the order of magnitude of the effect in vivo can be obtained more clearly.

Conclusions

The reported experiments show that embedded metals in tissue subjected to electric high frequency treatments (with short wave condenser fields) tend to deform the field distribution and can lead to field concentrations. The experiments of Etter, Gersh and Pudenz, on the other hand, show that in experiments on animals no dangerous overheating could be observed in treatments at normal, clinically used, intensities. The apparent disagreement between the two results may find an explanation in the following way:

The presence of a field-concentrating effect of the tantalum can be assumed in all the experiments reported by Etter, Gersh and Pudenz. In some of these experiments the temperature on the side of the metal is higher than on the control side. The authors attribute this effect partly to the interference with the circulation. The effect arises, however, primarily if the intensity of the treatment is high and the time short. As far as can be concluded, the phenomenon is the same as that described, i.e., clear indication of field deformation, which is, however, leveled off by heat conduction, if the intensity of the treatment is low and/or given over long times. This same phenomenon makes it also impossible to observe a histologic change in the tissue contiguous to the implanted metal. Heat conduction in the organism levels off these differences.

My conclusions are, therefore, that the experiments of Etter, Gersh and Pudenz show that for the investigated practical cases, primarily those in which tantalum is embedded deep into the tissue, the field concentration is of little practical significance. This result is, however, not to be generalized. Under certain conditions, as previously outlined, the field concentration provoked by implanted metals can well rise up to values that are dangerous to the tissue contiguous to the metal.

Factors to be Considered in Evaluating Effect of Treatment in Anterior Poliomyelitis: With Special Reference to Improvement in Muscle Strength

Norman Nelson, M.D., Dr. P.H., Los Angeles. In ARCHIVES OF PHYSICAL MEDICINE, 28:6:358, June 1947.

There has been a considerable divergence of opinion in the medical profession concerning the relative value in altering muscle strength of various therapeutic procedures used in the treatment of the paralysis of anterior poliomyelitis. Hansson (1942), in discussing the present status of physical therapy in anterior poliomyelitis, asked the question: "Why is it that such a divergence of opinion is found in a relatively short period of time concerning the treatment of poliomyelitis?" and answered himself, "This is undoubtedly due to the fact that it is extremely difficult to estimate properly the relative value of any particular form of therapy." In the present discussion I intend to show that this extreme difficulty in estimating the value of any given type of therapy is

due, at least in part, to the presence of significant factors affecting the return of muscle strength, which are inherent in the recovery pattern of the disease itself and are independent of treatment. These factors undoubtedly have served to obscure and distort the picture of the effect of treatment.

The present paper is based on the study of the leg paralysis in 400 cases of paralytic poliomyelitis followed at the Harvard Infantile Paralysis Commission Clinic over a period of five years. This five year period was chosen arbitrarily because it was long enough to enable one to study the recovery of muscles over a significant period and still short enough not to cut down too much the number of cases available. All the leg muscles in the group of 400 patients which had an original paralysis grading of "gone", "trace", "poor" or "fair" were included.

Summary and Conclusions

In this study I have presented factors commonly neglected in evaluating the effect of therapy on muscle strength in poliomyelitis and have suggested methods of avoiding fallacies introduced by them. These factors and their corresponding suggestions are:

1. The time of original muscle examination in relation to onset of the disease: The possible percentage improvement is considerably more for a given degree of paralysis at one month after onset than for the same degree of paralysis at two months. The date of the examination from which percentage improvement is calculated must, therefore, be standardized for all patients being evaluated.

2. The original severity of paralysis of each muscle: In evaluating the relative improvement in any two groups of patients only the same degrees of original severity should be compared. Thus, the improvement in "fair" muscles in one group may be compared only with the improvement in "fair" muscles in the other group, etc. By doing this one avoids statistical and actual fallacies involved in any comparison of unequal quantities.

Unless these factors are taken into consideration, the application of a treatment which has no effect on the paralysis of poliomyelitis to patients with mild degrees of paralysis early in the disease may appear on the surface to yield remarkable results, while the application of the same treatment to the same patients later in the disease or to patients with severe paralysis may appear actually to do harm. In neither case would the true picture be obtained.

The Effects of Diathermy on Tissues Contiguous to Implanted Surgical Metals

H. S. Etter, Commander (MC), U.S.N., R. H. Pudenz, Lt. MC(S), U.S.N.R. and I. Gersh, Lt. H(S), U.S.N.R., Bethesda, Md. In ARCHIVES OF PHYSICAL MEDICINE, 28:6:333, June 1947.

The potential danger of short wave diathermy in patients with metals embedded in their tissues has been a subject of much discussion by physiatrists. The danger allegedly arises from the possibility that the diathermy, even in therapeutic dosage, might either heat the metals to temperature sufficiently high to injure contiguous tissues or distort and concentrate the field immediately surrounding the metal. The importance of the problem has increased considerably since the onset of the war. In addition to the enormous number of patients with retained shrapnel and other missile fragments, an increasing number of casualties are being treated by permanent or temporary implantation of metals in tissue. Undoubtedly the most serious consequence of diathermy would be the destruction of important peripheral nerves which, because of wrapping in tantalum foil or contiguity to bone plates and screws, would make these structures particularly vulnerable. Destruction of skin, bone and muscle is similarly possible. Although diathermy is not commonly administered over the brain, its use in the treatment of sinus infections and cerebral vascular disorders might expose metal skull plates to the short wave field.

Summary and Conclusions

1. Short wave diathermy, i.e., short wave radio frequency was applied to the tissues of experimental animals in which tantalum and silver plates, foil and wire and stainless steel plates were embedded. The metals were wrapped around the sciatic nerves or inserted into intramuscular or subcutaneous pouches or fitted into skull defects over the intact dura.

2. There was no significant difference between the temperature on the side containing the metal and that on the control side, irrespective of the diathermy machine used, the method of application of the short wave energy or the nature of the metal used.

3. Histologic examination of tissues contiguous to the metals disclosed no significant destructive effects from diathermy attributable to the presence of the metal. When destructive changes occurred, they were equally extensive on the control side and were due to burning by excess heating. A striking finding was the lack of significant change in sciatic nerves wrapped in tantalum foil when the diathermy had caused a third degree burn of the overlying skin.

4. In all the animals in this series the major blood supply was anatomically intact. It is conceivable that when the circulation is impaired, either by trauma or peripheral vascular disease, tissue damage by the use of diathermy may result. It is standard practice to be extremely cautious in the use of diathermy in such patients.

Physical Therapy in War Injuries of Peripheral Nerves

I. Yu. Tarasevich, Kh. M. Freidin, and A. R. Shugam. In AMERICAN REVIEW OF SOVIET MEDICINE, 4:5:391, June 1947.

All patients received mud baths every other day alternating with artificial sulfur hydrogen baths. Each course included 15-17 mud treatments at 42-46 C. for 15-20 minutes, and 12-15 baths of artificial sulfurated hydrogen (concentration of 150 mg. per liter) at 35-36 C. lasting 2-12 minutes. In causalgia the temperature of the mud was reduced to 38-40 C. Five patients who suffered particularly stubborn pain were treated with novocaine block by Vishnevski's method. All the patients also were given physical exercises and massage.

Atrophied muscles did not respond readily, although an increase in size was observed in most cases. Physical training contributed to the increased size of the muscles. In 12 of 18 patients with diminished or absent reflexes of the upper extremities, improvement was noted. Restitution of absent reflexes in tendon Achilles were not observed. Twenty-two of 39 patients on whom electrical responses were carried out showed a return of partial reaction of regeneration at the end of treatment.

Patients in the third group had received a second course of treatment followed by partial recovery. Six patients showed a certain amount of improvement with the first course of treatment, but after 2-3 months there was no more improvement. They were admitted to the Institute for a second course of balneotherapy and physical culture which acted as a fresh stimulus to the latent reparative processes.

Phantom Limb

J. R. Ewalt, G. C. Randall and H. Morris. In PSYCHOSOMATIC MEDICINE, 9:118, March-April 1947. Abstracted in JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 134:13:1131, July 26, 1947.

The report presented by Ewalt and his associates is based on observations on amputees during their stay in an army general hospital. Of a series of 2,284 patients with amputations, 404 had detailed psychiatric study. Phantom sensation has been found to occur in practically all individuals who are studied carefully. Spontaneous complaints of pain were rather rare among the group. The patients complaining of phantom pain were persons who had psychopathologic manifestations complicating the orthopedic picture. The authors gained the impression that phantom pain is merely the interpretation of a phantom sensation by certain psychopathologic persons. Two cases are reported which support this view. In both the pain tended to come and go with psychopathologic symptoms irrespective of what type of external treatment was carried on.

Spontaneous Regeneration of Severed Nerves

Lewis J. Pollock, M.D., James G. Golseth, M.D., Frank Mayfield, M.D., Alex J. Arieff, M.D., Erich Liebert, M.D., Chicago and Capt. Y. T. Oester, MC, AUS. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 134:4:330, May 24, 1947.

It has long been known by physiologists and anatomists that it is more difficult to prevent regeneration of a severed nerve or one from which a large segment may have been removed than to obtain regeneration of the severed nerve after suture. This has been found to be true whatever measures may have been taken to prevent regeneration.

Among the cases selected for a study of the kinetics of stimulus at the Percy Jones General Hospital were 84 instances in which at operative intervention the ends of severed nerves were separated by gaps up to 9 cm. in length. Only in 1 case, that of an injury to the median nerve, was stimulation of the distal segment effective in producing motion in some of the muscles supplied by the nerve.

In 12 cases the chronaxia was less than 15 milliseconds. Of these, 3 were cases of injury to the peroneal nerve; 4 radial; 1 tibial, and 4 ulnar.

Comment

Although at operation the ends of severed nerves may have been separated by gaps of some distance, prior to surgical intervention there was evidence that nerve fibers had found their way into the distal segment.

This evidence consisted of return of sensation in a few cases, even of motion in 1 instance, and in such response of muscle to electrical stimulus as is indicative that the muscle is not completely denervated. Among the instances of such response were a number of cases with short chronaxia and response to faradic stimulation. In almost all cases there was found a galvanic tetanus ratio of more than 1.0

Since we have found that the galvanic tetanus ratio of a completely denervated muscle remains 1.0 for as long as we have observed such a muscle, at times for over a year, we consider that we are on safe ground when we conclude that a galvanic tetanus ratio of over 1.0 is indicative of some neurotization of a muscle.

By a fortunate circumstance of having available to us the data obtained before operation and at intervals afterward, we have been able to show that when the preoperative galvanic tetanus ratio was greater than 1.0, at the expected time for denervation after resection and suture of the ends of the severed nerves the galvanic tetanus ratio fell to 1.0.

This we consider to be sound proof that despite long gaps between the severed ends, nerve fibers find their way into the distal segment and muscle. Whether such regeneration would lead to good functional recovery cannot be answered. It is probable that despite evidence of neurotization of muscle or of even return of sensation and motion, good functional recovery would not take place.

Conclusions

1. At the time that gaps of varying lengths between ends of severed nerves have been found on operative intervention, there has been evidence that fibers had found their way to the distal segment. This evidence consisted of: in a few instances, a return of sensation; in a considerable number, a short chronaxia and response to faradic stimulation of muscle, and in most, a galvanic tetanus ratio of over 1.0.

2. Histologic examination revealed the presence of neurofibrils in the distal segments of the severed nerve.

3. Spontaneous regneration, probably of insufficient degree to result in recovery of function, occurs to some extent in most instances of severed nerves.

Physical Medicine in the Care of Rheumatoid Arthritis

Howard F. Polley, M.D., Rochester, Minnesota. In SOUTHERN MEDICAL JOURNAL, 40:7:596, July 1947.

Daily treatment in the home is an advantageous supplement to professional treatment.

The luminous source of radiation is richer in the slightly more penetrating infra-red rays than are resistance coils or other nonluminous sources of radiation.

Hot paraffin or hot fomentations are other simple and effective means of applying heat locally to the back or extremities.

Fever therapy is customarily not used or is used in a milder degree for patients who show evidence of senility or are markedly debilitated by the rheumatoid arthritis or some other noncomitant condition.

Mild fevers by means of hydrotherapy alternated with luminous bakers and other means of producing local or general heating in the home provide the basis for a sound, practical and efficient physical treatment program.

Patients should be cautioned that poor or even harmful results may obtain if massage is given too heavily, too vigorously or too roughly.

Therapeutic exercise is valuable in preventing deformity and ankylosis of the joints. It also helps to increase circulation, muscular strength and general metabolism. A regular program of exercise for uninvolved as well as involved joints often helps to shorten convalescence when activity is resumed.

In addition to exercise administered under the guidance of the physician and therapist, the patient may be advised to repeat the exercises in his home at least several times daily, thus increasing the effectiveness of the physical treatment. When the patient is able to carry out active therapeutic exercise he should be expected to assume a large share of the responsibility for prevention of deformities or for their correction if they are already present.

In most instances, the patient should have ten to twelve hours of rest in bed during each twenty-four hours. This should be continued even after the disease becomes quiescent. More hours of rest or complete rest in bed may be indicated in the presence of fever, marked

debility, progressive loss of weight or progression of the active stages of the arthritis. The bed should have a firm, nonsagging mattress and springs. The patient should be in a position favorable to correct bodily mechanics. The use of pillows under the knees should be avoided. Adequate rest can be correlated advantageously with carefully prescribed exercises and other physical treatment.

Physical Medicine and Cold Injury of the Limbs

Irwin D. Stein, M.D., New York. In ARCHIVES OF PHYSICAL MEDICINE, 28:6:348, June 1947.

The subject of cold injuries of the limbs and their treatment is particularly appropriate for a meeting devoted to physical medicine—appropriate in the sense that the causative agent (in this case, cold) is a physical one and, more important, because in treatment physical measures play a stellar role.

Injuries produced by cold masquerade under many guises. Despite the romantic halo cast upon them, they all have one common basis, intracellular damage, which is roughly proportional to the intensity of the cold and to the duration of exposure.

Treatment

Treatment of cold injuries up to the present time has been for the most part a makeshift affair. Even during the early part of World War II there was no unanimity in therapy; hence, patients at one hospital were subjected initially to sympathetic block, and at others they were treated by enthusiastic advocates of short wave diathermy, or Paevex and intermittent venous occlusion, even simple heating by means of a lamp or by whirlpool baths. Such enthusiasm, based on a failure to comprehend the physiologic basis for cold injury, speeded up and added to the destruction already present and countless toes and even limbs were lost through these well meaning but misguided therapeutic attempts.

If there has been one thing advanced in the treatment of early cold injuries it has been the minimizing of the destructive phase of arteriolar and capillary dilatation. The ideal treatment consists in essence of maintaining the affected limb uncovered in a cool room at a temperature between 65 and 70 F. and elevation of the involved extremities about 8 inches to facilitate venous return and absorption of edema. In this manner tissue metabolism is lessened and vasodilatation lessened. It is a well established fact that in such low environmental temperatures the toe temperature conforms rather closely to the room temperature, whereas raising the room temperature to 75 to 80 F. frequently produces maximum vasodilatation in the toes, with temperature readings of 90 to 95 F.

Physical Medicine and the Rheumatic Diseases

Francis Bach, D.M., D.Phys.Med. In BRITISH JOURNAL OF PHYSICAL MEDICINE, 10:3:66, May-June 1947.

The Physical Medicine Department is an essential part of a modern hospital. It should include a gymnasium, with a physical training instructor, and an occupational therapy department, with workshops in which specific remedial and diversional work can be carried out under the supervision of a trained occupational therapist. It must be under competent medical supervision, properly planned and equipped for the treatment of in-patients and out-patients, and have an adequate staff of qualified physical therapists. Proper and detailed records must be kept of the patients and of their treatment. In a teaching hospital, in addition to the treatment of patients, facilities must be available for research and for undergraduate and postgraduate teaching in physical medicine.

In a large general hospital, facilities should be available, not only for restoration of function in the disabled part but also for the reabling of the man or woman as an individual, so that, on his discharge from hospital, he may be able to return to a full, contented and happy home life, as well as be fit to take up once again his former employment, or else be trained for some modification of this work or for some other trade or profession. An almoner must be attached to the unit and attend the clinics held by the physician-in-charge. She must form a close link between the department and the patients home, his work and his own physician.

For out-patients, evening clinics must be held and, for temporarily disabled patients, facilities for transport between home and hospital must be provided.

Staff conferences should be held at weekly intervals to discuss the progress of the patients.

The physical medicine department and the physical therapist have a very important role to play in the treatment of the rheumatic patient. Rheumatism is a term which is used to cover a variety of conditions: the so-called "growing pains" of the young child; the painful elbow in a young woman, which may follow the first game of tennis of the season; the stiff neck often attributed by the rhinologist to infected tonsils or by the psychologist to an emotional upset.

The child with rheumatism in a quiescent phase will benefit from a course of general ultraviolet light and postural and breathing exercises. The painful elbow or stiff neck—dependent upon its pathology—may be relieved by friction massage, manipulation, traction, short-wave diathermy, ionization with novocain or aconitine, or simple psychotherapy.

Backache and Fibrositis: A Medical Point of View

W. R. Caven, M.A., M.D., Toronto, Ont. In CANADIAN MEDICAL ASSOCIATION JOURNAL, 57:1:37, July 1947.

The essential part of treatment is to stretch the tissues involved, by some means or other, either by traction where that is possible or by firm massage directly on the tender nodules.

Before any manipulative treatment is undertaken it is wise to have x-ray films made of the spine to rule out abnormal bone conditions and to be sure that the bones are not partially decalcified through old age, and therefore fragile.

The treatment of the neck and shoulder areas, when they are involved, should be done first. The table or couch should be firm but not hard and the head end of it should not be raised. The patient is to lie flat on his back with the shoulders at the head end of the table and the head supported by the physicians left hand. The right hand is placed below the patient's chin and direct traction exerted. This should not be more forcible than is necessary to relax the neck muscles and there should be no suggestion of moving the patient's trunk by the pull. This steady traction should be continued for about one minute and may be repeated at the end of the other manipulations. Next the head is held firmly by a hand on each side and moved upward and toward the patient's feet while at the same time the face remains looking directly upward. This maneuver is easy to do but difficult to describe and it is a movement which cannot be done voluntarily.

After the manipulation the patient should sit up and be given instructions about general care, and special exercises which he can carry out until seen again.

Diathermy Machines

Allen C. Stephens, E.E., Washington. In MEDICAL ANNALS OF THE DISTRICT OF COLUMBIA, 16:4:180, April 1947.

In summary, the following points should be considered both as to public interest and self-economics.

1. Diathermy now causes serious radio interference.
2. The F.C.C. can stop an interfering machine from operating.
3. Interference can be stopped by complete shielding or by getting a machine which meets the new regulations.
4. The new regulations are in the public interest and safety. Physicians can cooperate with their local communities by making sure that their machines meet the F.C.C. regulations.
5. The full effect of enforcement of these regulations by the F.C.C. will probably be felt within two years.
6. It is suggested that, prior to purchase, a written statement be obtained to the effect that a machine does meet the F.C.C. regulations, the exact extent thereof, and how the machine will be marked with this information.
7. It is important that service be available in order that if the machine should begin to operate outside its approved limits, the cause may be remedied without delay.

Control of Peripherial Blood Flow: Responses in the Human Hand When Extremities are Warmed

B. G. Ferris, Jr., R. E. Forster, II, E. L. Pillion and W. R. Christensen. From the U. S. Army, Quartermaster Corps, Climatic Research Laboratory, Lawrence, Mass. In AMERICAN JOURNAL OF PHYSIOLOGY, 150:2:304, August 1, 1947.

Previous investigators have concluded that sympathetic activity produces active vasodilatation and active vasoconstriction. The possibility that sweat gland activity might cause vasodilatation also has been investigated, but no such relationship has been demonstrated. However, it has been reported that indirect vasodilatation or vasoconstriction may occur in an extremity when other body segments are heated or cooled. Occlusion of the venous return from such heated segments usually prevents the occurrence of this indirect vasodilatation, probably eliminating heat receptors and a nervous reflex as mediators. However, Pickering reported that venous occlusion of a cooled extremity does not prevent transient indirect vasoconstriction.

Because the phenomenon of vasoconstriction appears in sympathectomized limbs, adrenaline has been postulated as a mediator. Stomach irrigations with cool water also have produced indirect vasoconstriction. These previous studies indicate that average blood temperature (the true deep body temperature) probably affects peripheral vascular flow.

In one of the initial studies, Roy and Brown, working with frogs, stated that peripheral blood flow is dependent upon local tissue temperature and concentration of tissue metabolites. Freeman concurred with this hypothesis, but only for sympathectomized extremities; in normally innervated hands, he found that the blood flow is modified reflexly in accordance with the need of the body as a whole for dispersion or for conservation of heat. Pickering, working with human beings, reported that central control is concerned with protection against cold or excessive heat.

Although these studies indicate that average blood temperature probably affects peripheral vascular flow and that central control protects the body as a whole against cold or excessive heat, the nature of local control has not been clearly defined. Freeman initiated a different approach to this problem. He studied, at one ambient temperature (approximately 24 C.), the effect in one hand when the other was warmed and observed increases in blood flow and skin temperature of the unheated hand. To investigate this problem more fully, direct and indirect vasodilatation in response to local heating have been studied at ambient temperatures ranging from 16.4 to 30.2 C. The results obtained are presented in this paper.

Summary

1. The blood flow of the hands of two lightly clad, healthy, white, male subjects was investigated at ambient temperatures ranging from 16.4 to 30.2 C., by means of two plethysmocalorimeters. In this investigation, one hand was heated to various levels of skin temperature and any alterations in the skin temperature and blood flow of the opposite hand were recorded.
2. Deep tissue temperatures indicated that the heating and cooling of the respective extremities was not confined to the skin.
3. Further studies were conducted in which either one or two legs were immersed to a depth of 39 cm. in hot water baths (38 C., 40 C., and 42 C.) at an ambient temperature of 17.5 C.; the effects on hand skin temperature and blood flow were observed.
4. When a "steady state" has been reached at ambient temperatures of 21.5 C. and lower, the blood flow in the hand appears to be dependent upon the overall need of the body for the conservation of dissipation of heat. Indirect vasodilatation can be induced if sufficient heat is applied.
5. At ambient temperatures of 21.5 to 25 C., a delicate vasomotor balance exists and slight additions of heat to one part of the body produce vasodilatation in other parts.
6. At an ambient temperature of 30 C., an increase in the blood flow of the heated hand occurs. This may be regarded as a protective mechanism for the removal of excess heat. At this temperature, no significant changes were observed in the unheated hand.
7. The results of these studies appear to indicate that under cold ambient conditions (21.5 C. or lower), the central mechanism controls peripheral blood flow for the purpose of conservation of dissipation of heat, whereas in higher temperature ranges, local control may become active and indirect vasodilatation may be induced.

Physical Therapy in the Management of Tendon Repair

George D. Wilson, M.D., Asheville, N. C. In ARCHIVES OF PHYSICAL MEDICINE, 28:7:439, July 1947.

The physical therapy regimen for tendon repair is begun fourteen days following operation at which time the sutured tendon is ready for functional movements.

First Week.—Radiant heat and superficial effleurage are used and are followed by active exercises at the table for tendon grafts and muscle reeducation for tendon transplants; reexamination includes range of joint motion.

Second Week.—Radiant heat and superficial effleurage are continued together with active resistive exercises with apparatus for the particular extremity. Muscle reeducation is continued in tendon transplants with the therapist offering resistance; maximum muscle power is not determined at this time as used in a heavy resistive exercise program.

Third Week.—In tendon grafts radiant heat followed

by progressive type, active, resistive exercises, the patient using a low number of repetitions (ten) with each added weight until a total of sixty to eighty repetitions is completed. In tendon transplants after preliminary heating by radiant heat to insure adequate circulation, active resistive progressive exercises as advocated in a heavy resistive exercise program are used.

Daily inspection is made by the physiatrist to insure the exact range of motion in the joint being exercised and the amount of resistance. Daily inspection has been found especially advisable in cases in which silk sutures have been used in the surgical repair. It was noted that when silk sutures were used either in the tendon suture or in the skin suture or in both repaired areas there was a greater tendency for collection of serum or for stitch abscess formation, apparently in spite of surgical antisepsis and regardless of the amount and type of physical therapy. It was noted that the experienced surgeon preferred other suture material to silk. The importance of knowing the type of suture material is stressed, especially in those cases of tendon repair in which a gliding surface of fascia was provided and the possibility existed that a silk suture knot would cause irritation in the gliding surface with consequent swelling.

Arthroplasty of the Hip for Congenital Dislocation in Children

Paul C. Colonna, M.D., Philadelphia, Penn. In JOURNAL OF BONE AND JOINT SURGERY, 29:3:711, July 1947.

The primary purpose of this paper is to present an end-result study of an arthroplasty procedure, devised some years ago for treating congenital dislocation of the hip. There are certain indications for its use, and also contraindications which should be stressed, as well as postoperative safeguards, which should be borne in mind in the care of patients undergoing this operation. Naturally, the author has been keenly interested not only in observing the functional results in patients operated upon ten or more years ago, but he also has been anxious to satisfy himself by repeated follow-up roentgenograms that the reconstruction of the originally deficient acetabulum has been retained as to size and depth, and that a practically normal joint space has been preserved over the years.

Postoperative Care

When the hip is taken out of plaster at the end of four weeks and active and passive motion in bed is begun with the limb suspended, the simple expedient of keeping a pillow between the limbs to retain abduction of 10 to 20 degrees on the affected side has been found adequate to prevent any danger of redislocation. This complication has not occurred in any of our series, but if, upon removal of the plaster, some effort is not made to limit abduction, this could conceivably happen. The author also favors keeping five to ten pounds of traction on the limb during the first few weeks of active movement in bed. If a therapeutic tank is available, the patient should move the limb a part of each day in this medium. The patient should be encouraged to sit up, but in order to prevent the development of any flexion contracture at the hip, the patient should be turned on his abdomen for a part of each day.

From the time the plaster is removed, particularly in the early weeks, the hip must be examined often for the effects of imbalanced muscle pull, particularly from the adductors and flexors. A good deal of functional adjustment has to be made in this reconstructed hip, as in all joints subjected to arthroplasty, and some coddling and watchful attention to details will spell success in the future progress of the hip. Not until a good range of active and passive movement in bed can be demonstrated, and any tendency to adduction and flexion has been corrected, should weight-bearing be permitted. It is difficult to give a time when weight-bearing should be begun, as this would have to be decided upon in the individual cases; but it is safe to say that a minimum of three months and sometimes as much as six, may elapse from the time of the operation before it is wise to allow the patient to begin putting weight on the hip for limited periods during the day. During the weeks of limited weight-bearing, starting with a few minutes and gradually increasing, the hips must be carefully watched for any signs of stiffness or loss of motion. At the slightest evidence that the hip is "tightening up," the patient must return to bed. Traction for a few days usually will be sufficient to restore the previous range of motion. The use of braces to protect the hip against weight-bearing is not advocated; and only occasionally is a child found cooperative enough to be allowed to be up on crutches in less than three months, to bear weight on the normal side, and to swing the affected hip.

The roentgenograms shown represent five of the early cases which have been followed for many years. They demonstrate that the normal bony architecture of the hip has been restored.

A moving picture shown by the author at the Academy meeting demonstrated these children, ten to thirteen years after operation, walking without a limp and with an excellent range of active and passive movement.

Osteochondritis Dissecans of the Talus

R. Beverley Ray, M.D., Memphis, Tenn., and Edward J. Coughlin, Jr., M.D., Williamstown, Mass. In JOURNAL OF BONE AND JOINT SURGERY, 29:3:697, July 1947.

The aseptic separation of a fragment of articular cartilage, with or without subchondral bone, known as osteochondritis dissecans, although more common at the knee, may involve any joint. Cases have been reported of lesions involving the shoulder, the elbow, the hip, the wrist, the metatarsophalangeal joints, and the ankle. Involvement of the ankle is usually in the trochlear portion of the talus, and has been considered very uncommon. Sporadic cases of osteochondritis dissecans of the talus have been reported; in 1941, Mensor and Melody reviewed the literature on the subject and reported one case, which was the twentieth case reported up to that time. Since then, four additional papers, reporting a total of nine new cases, have appeared in the literature. In addition, the authors have found a report made by Schnaberth in 1939, in which a case with extensive involvement of the talus was described. In view of the fact that, during the past four years, the authors have been able to collect a series of thirteen patients with fourteen ankles involved, and have discovered three additional cases through personal communications, it is felt worth while to report these cases and to discuss the condition in some detail.

Postoperative Treatment

Postoperative immobilization is dependent upon the type of approach used and is unnecessary unless an osteoplastic or tendoplastic procedure is employed. Similarly, weight-bearing and active motion are allowed as soon as the healing of the operative trauma permits. If a purely soft-tissue approach is used, active use of the part is usually begun within from ten to fourteen days. Postoperative physical therapy is not required, but whirlpool baths and supervised active motion may hasten convalescence.

Rest Versus Activity in the Treatment of Fractures

Foreign Letters—London. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 134:2:204, May 10, 1947.

In a presidential address to the Orthopedic Association Mr. George Perkins stated that the enormous advantages to be derived from activity of a fractured limb are not sufficiently recognized. Thus the hand is still immobilized for fracture of the scaphoid with the thumb abducted in the plane of the palm, instead of at right angles to it. In this faulty position the patient cannot oppose the thumb and fingers, and the use of the hand is seriously curtailed. The foot is immobilized in slight equinovarus instead of in the plantigrade position, so that there is great difficulty in walking. The advantages of encouraging activity of the limb are that rehabilitation can proceed hand in hand with bone repair, and the harmful effects of splintage are minimized. It is no longer necessary to apply an Unna's paste bandage after removal of a plaster for fracture of the tibia and fibula. Postplaster swelling has disappeared from the practice of those who make their patients walk normally while wearing a plaster cast.

Exercise for Free Joints

Mr. Perkins laid down the rule that all joints not immobilized by splintage should be moved actively by the patient. The splint should be shortened to the minimum, so as to free as many joints as possible. Longitudinal compression of the bone ends was the essential stimulus for bone (as opposed to fibrous tissue) repair. Hence the value of early weight bearing. Most surgeons would advocate it but for fear of overriding of the fragments, but Mr. Perkin's experience was that little is to be feared. He grants, however, that there is a danger in transverse fracture when the two fragments are not parallel, for a force not perpendicular to the line of fracture tends to angulate the fragments, distracting the raw bony surfaces from one another and stimulating the production of fibrous tissue.

Mr. Perkins holds that the main reason why a healthy joint stiffens as a result of splintage is that the muscles lose their power of lengthening. This can be prevented by making them contract and relax periodically throughout the period of immobilization. They need not be stretched to the full extent. In a fractured scaphoid the wrist can be immobilized for months without becoming stiff if the patient uses his fingers. A muscle under a splint will continue to act in a synergic capacity provided one of the joints over which it spans is free to move. If in fracture of the shaft of the femur both knee and hip are immobilized—as they must be if the splint is to keep the fractured ends from moving—the thigh muscles cannot act synergically because both origins and insertions are fixed. The consequence is a stiff knee. But if the hip is not splinted and the patient is encouraged to lift his leg (he need not bend the knee) the synergic action of the thigh muscles is retained and the knee does not stiffen.

Reflex Vasodilatation in Human Skeletal Muscle in Response to Heating the Body

H. Barcroft, the late W. McK. Bonnar and O. G. Edholm, Physiological Laboratory, the Queen's University, Belfast. In THE JOURNAL OF PHYSIOLOGY, 106:3:271, July 31, 1947.

Grant & Pearson (1938) studied the effect of warming the body on the blood flow in the human forearm. They found a small vasodilatation which they thought was in the skin. Wilkins & Eichna (1941) found a larger dilatation, and, since it appeared before any rise in the temperature of the skin of the opposite limb segment, they considered that it was deep to the skin, presumably in the muscle.

The object of this paper is to give further evidence for reflex vasodilatation in skeletal muscle in response to heat, in so far as it can be inferred from experiments on the blood flow in the forearm. Observations have been made on normal forearms, on sympathectomized forearms, on forearms with the skin flushed by mustard and on those with the skin blanched by adrenaline.

Summary

1. The blood flow in the forearm (Lewis & Grant's plethysmographic method) was studied during body warming produced by covering the subjects with two blankets and putting both feet in water at 44-45 C. for 50 min.

2. Body warming increased the blood flow in the forearm on the average, from 3.1 to 9.3 c.c./100 c.c. forearm/min.

3. The effect was absent in sympathectomized forearms; it was a vascular reflex mediated by the sympathetic (confirming Wilkins & Eichna, 1941).

4. A flushing of the forearm skin, produced by mustard, increased the forearm blood flow to about the same extent as body warming. Since, however, body warming did not flush the skin it was likely that the heat vasodilatation was for the most part deep to the skin.

5. Body warming increased the blood flow in the forearm when the skin blood vessels were intensely constricted by adrenaline. It was concluded that the dilatation was for the most part deep to the skin, most probably in the skeletal muscle.

6. The increase in total muscle blood flow during body warming, as above, would probably have averaged about 1.5 l./min.

Graded Leg Exercises

Joseph K. Narat, M.D., and Arthur F. Cipolla, M.D., Chicago, Illinois. In SURGERY, 21:6:861, June 1947.

The efficiency of postoperative exercises in prevention of pulmonary embolism is attested by Erskine and Shires who reported that the incidence of fatal embolism after abdominal operations was reduced by more than one-half following introduction of postoperative exercises and massage. Shaw and Rickards found fatal embolism to be five times more common in a hospital where exercises are not included in the postoperative treatment as compared with another institution where exercises are carried out as a routine.

While the value of leg exercises has thus been established, certain disadvantages of the devices now in use must be mentioned: most of them are bulky and either take considerable space in the bed, interfering with the patient's comfort, or protrude from the bed, blocking the free passage in the room; patients must be uncovered to perform the exercises; some devices are impractical or expensive or both; they are time consuming because they require supervision; finally, they provide no facilities for registration which is essential because pain, lack of interest, or lassitude caused by sedation may prevent the patient from faithfully carrying out the prescribed order.

Summary

A new apparatus for leg exercises has a very simple construction, is inexpensive, occupies practically no space, does not require uncovering the patient, and registers the number of exercises.

The Use and Abuse of Rest

Lord Horder, G.C.V.O., M.D., F.R.C.P., Physician in Ordinary to H.M. The King; Consulting Physician, St. Bartholomew's Hospital. In THE PRACTITIONER, No. 950, August 1947.

In medicine two names stand out prominently in connection with the advocacy of rest as a therapeutic agent —John Hilton in this country and Weir Mitchell in America. Hilton's lectures on "Rest and Pain" were delivered at Guy's Hospital during 1860-2; in 1874 Weir Mitchell "developed for a single seemingly hopeless case, literally at a woman's bedside, the treatment by seclusion, rest, massage, full feeding and electricity," which for many years carried his name, and told in lectures during 1875-7 what he had done. Both these pioneers were subjected to considerable criticism, each in his own day, and especially Weir Mitchell. This was an inevitable consequence of the promulgation of a new doctrine—new, it should be said, in its application, although admittedly old in its principle.

"Rehabilitation" in its widest sense has made a large contribution to a scientific assessment of the need for, and employment of, rest periods both in the medical and in the surgical fields. Originally a concept based upon economic grounds it has pervaded the physiological and psychological spheres and has proved of great value in the hands of thinking and trained physicians and surgeons.

The sure and acknowledged place which psychotherapy has achieved in the treatment of the neuroses and the minor psychoses since Weir Mitchell's time has displaced the isolation which was a prominent part of his system, so prominent, indeed, that it was not uncommon to see "quietness grown sick of rest" replaced by despair, a worse state than mere boredom.

How to rest.—This does not come by instinct. If it did, the patient would not so often require it. Indeed, training in relaxation might be regarded as prophylactic treatment against the "nervous breakdown" for which rest is so often prescribed. Call it "meditation," "yogi," "the quiet hour," or what you will, it has a hygienic value that goes back at least to Marcus Aurelius, and the value is both spiritual and physical. If now, for lack of this habit, the hot and chafing mind, dragging its "tired" body with it, needs rest, the physician must give the necessary instruction, even demonstration, and must follow up his teaching by frequent contacts so that he may be assured that the instruction is understood and observed. Throughout all this the physician's attention must be equally divided between the patient's body and his mind, between the spasm at his pylorus or in his colon and the spasm in his mind. In this way only can rest achieve its full and proper purpose.

Physical Medicine and Gynecology

G. E. Hesketh, M.D., Medical Officer, Burton Road Hospital, Lincoln. In BRITISH JOURNAL OF PHYSICAL MEDICINE, 10:4:98, July-August 1947.

Physical treatment in obstetrics and in gynecological surgery

Exercises—Antenatal and postnatal exercises have now a well-established place in obstetrical practice.

A series of graduated exercises commencing towards the end of the first week after operation would do much to increase the confidence of the patient when she is first allowed to get up, and would prevent stooping and poor posture. Foot-rolling exercises, quadriceps contraction and breathing exercises are now well-recognized methods of postoperative treatment in those departments which recognize the value of the physical therapist.

Exercises to strengthen the muscles of the pelvic floor after childbirth and to encourage the uterus to revert to a correct position have long been part of the routine of the more conscientious maternity departments.

Dysmenorrhea—Dysmenorrhea due to underdevelopment of the uterus with a congenitally stenosed cervical canal, may be treated by gradual dilatation of the cervix by negative galvanism. Kovacs (1945), discussing medical galvanism, states that negative galvanism is an efficient means of gradually dilating a congenitally stenosed cervix. A metal cervical electrode is connected to the negative pole, and a dispersing pad, placed above the symphysis, is connected to the positive pole. An active electrode of the smallest diameter should be first applied, and the initial current of 3 milliamperes should be gradually increased to 10 milliamperes. White bubbles appear round the cervical electrode within a few minutes; the electrode may be turned with ease, and the next larger size will fit in comfortably. Dannreuther (1928), after many years of experience with this method of cervical dilatation, prefers it to the forcible method of dilating, and it can be performed without anesthesia. He claims that the method will accomplish anything which the forcible dilatation under anesthesia will do, but Kovacs (1945) has not been greatly impressed with his trial.

Local thermal treatment at the onset of the pain of dysmenorrhea may give considerable relief. A hot compress to the abdomen and the hot sitz bath each has its place, and the cold sitz bath in the congestive type of dysmenorrhea is recommended by Krusen (1946).

Sanderson Clow has popularized the treatment of dysmenorrhea by *postural exercises;* she recommends the continuation of games and exercise during the period of menstruation. Miller (1935) has confirmed that there is a considerable reduction of dysmenorrhea when posture and muscle tone are improved.

The Diagnosis and Treatment of Peripheral Nerve Injuries

Warner L. Wells, M.D., Raleigh. In NORTH CAROLINA MEDICAL JOURNAL, 8:8:439, August 1947.

Postoperatively, the limb is maintained in proper position with a plaster splint or cast.

Physical therapy in the form of heat, massage, passive movement, exercise, manual training, and electrical stimulation is of inestimable value both pre- and postoperatively as a means of preventing or overcoming contracture, maintaining adequate nutrition, and hastening reeducation. It is important to point out to the patient the necessity for continuing at home the professional physical therapist's measures, which rarely consume more than an hour every day or two.

The patient should, moreover, be taught to guard against injury to the part.

Corrective splints and braces are used to prevent or overcome contractures, to prevent overstretching of paralyzed muscles and their tendons, and to compensate for muscles lost through paralysis.

Recovery is manifested by a progressive descent of Tinel's sign. Sensation, motion, and trophic supply appear in that order.

In general, the radial, axillary, and musculocutaneous nerves have good function within a year after suture, the median and ulnar in eighteen months to two years, the femoral in twelve months, the sciatic in two to three years, the peroneal and tibial in eighteen months.

Functional Aspects of the Abductor Muscles of the Hip

Verne T. Inman, M.D., San Francisco, California. In JOURNAL OF BONE AND JOINT SURGERY, 29:3:607, July 1947.

Discussion and Conclusions

The study of the forces acting in and around the hip joint explains numerous, apparently unrelated, clinical observations.

The reacting force in the head of the femur resists not merely the pressure of the superincumbent body weight, but, in addition, the force of the abductor muscles and the tension on the iliotibial tract which is necessary to hold the pelvis in equilibrium. This latter force exceeds the weight of the body by a ratio of from 1.4:1 to 1.9:1. The minimum static pressure on the head of the femur is approximately 2.4 to 2.6 times the body weight.

Normally this force is not borne vertically, but at an angle of approximately 165 to 170 degrees from the vertical and in line with the medial trabeculae of the femoral neck. This static force remains constant in direction, irrespective of whether the pelvis is elevated or depressed on the non-weight-bearing side.

With the knowledge of the *direction* of the reacting force through the head and neck of the femur against the pelvis, the changing angle of the capital epiphysis during growth becomes partially explicable. Close inspection of roentgenograms of the upper end of the femur in individuals of various ages reveals that the epiphyseal line always lies at a right angle to the direction of the medial trabeculae of the femoral neck. Since the reacting force in the femur follows these trabeculae, there is no sheer on the epiphyseal cartilage. The only force to which it is subjected normally is a compressional one. As growth occurs, with increasing length of the femoral neck and increasing angle of pull of the abductor muscles and the fascia, the epiphyseal cartilaginous plate rotates so as to lie perpendicular to the equilibrant force in the femoral neck.

The interrelationship of these forces becomes altered in cases of paralysis of the abductor muscles and in congenital dislocation of the hip. In the first instance, the loss of muscle power prevents the attainment of equilibrium with the body in a normal position. To prevent the pelvis from rotating toward the non-weight-bearing side, the individual shifts his center of gravity over the affected hip by bending to that side. The resultant forces acting through the hip, become more nearly vertical. The equilibrant or reacting force in the femoral neck likewise shifts toward the vertical; the epiphyseal cartilaginous plate, remaining perpendicular to these forces, continues to be relatively horizontal; and coxa valga results. This is a constant finding in individuals who have had paralysis early in life, and the degree of coxa valga is in proportion to the loss of muscle power.

Coxa valga occurs in individuals suffering from congenital dislocation of the hip, for the same factors are at work. In these cases, the loss of fulcrum prevents the normal development of the abducting forces. The load is borne vertically on the femur, and the capital epiphysis reacts by remaining horizontal.

The so-called "antalgic" gait of the individual who has a painful disease of the hip joint is of interest. On the surface, it appears rather peculiar that a patient with a painful hip will walk by throwing himself over the painful joint, giving rise to a gait which may be compared with that of a gluteus medius weakness. By so doing, however, the individual shifts his center of gravity over the hip, thus decreasing the required pull of the abductor muscles. This, in turn, decreases the pressure upon the femoral head from a force of 2.4 to 2.6 times the body weight to simply the superincumbent body weight. This expediency of gait, while decreasing the total load on the femoral head, results in a change in the direction of the reacting force in the femur. Instead of the body weight being borne at an angle which thrusts the head into the acetabulum, the load is carried vertically upon the femur. This alteration in direction of the forces causes changes in the femoral head, which are depicted in the roentgenograms. In malum coxae senilis, the bone changes affect predominantly the superior aspect of the femoral head, because the forces are concentrated there. In epiphysiolysis the assumption of an antalgic gait, while leading to a decrease in the total load on the femur, causes that load to be borne vertically, with the result that a sheer is applied to the epiphyseal plate, which normally is not present. This sheer will facilitate further slipping.

The importance of the abductor muscles and the iliotibial tract in altering the direction of the reacting forces in the femoral neck should be emphasized. Any surgical approach to the hip joint which injures these structures and weakens the forces exerted by them will not only modify the magnitude, but also the direction, of the reacting force through the femoral neck.

Rapid Postoperative Mobilization

Vincent D'Ingianni, M.D., New Orleans. In NEW ORLEANS MEDICAL AND SURGICAL JOURNAL, 100:2:80, August 1947.

The results of rapid mobilization:

When a patient sits up alongside his bed six to ten hours after an operation he necessarily exerts himself, quickens his respiration and aerates the bases of his lungs. Motion causes a cough reflex and stirs the accumulated plugs of mucous in the bronchioles, thus diminishing the chances for atelectesis or patchy pneumonitis. Turning from side to side in bed does not accomplish this as does the upright position. Distention, probably due to swallowing air, is relieved by standing.

Vital capacity can only reach its maximum when a person stands upright and moves about; it is limited by the resistance offered to the back by the bed when a reclining position is assumed.

Rapid mobilization quickens circulation, thus lessening the chances for stagnation, clotting, and pulmonary emboli. There have been no instances of emboli among the 700 cases upon which this report is based.

Early body motion after operation maintains muscle tone, which is highly desirable. Present day orthopedists recognize this fact; their trend is away from heavy casts which restrict motion and thus cause muscle atrophy. Motion prevents the accumulation of waste products in the tissues.

Rapidly mobilized patients do not usually need purgation or catheterization for their normal body functions are resumed early after regular motion is resumed.

Pain and incisional discomfort which are often intense when a patient rises on the first or second postoperative day diminishes rapidly, if one is to judge by the number of injections of narcotics needed by the patients rapidly mobilized.

The attitudes of well-being and of independence, which are inevitable sequellae of rapid mobilization, are indeed worthy of mention.

The unanimous approval by the patients themselves of this method of postoperative treatment is significant.

Relations Between Cutaneous Blood Flow and Blood Content in the Finger Pad, Forearm, and Forehead

A. B. Hertzman, W. C. Randall and K. E. Jochim. From the Dept. of Physiology, St. Louis University School of Medicine, St. Louis, Missouri. In AMERICAN JOURNAL OF PHYSIOLOGY, 150:1:122, July 1, 1947.

Decreases in limb or organ volume frequently have been interpreted as indicative of increased arterial tone or decreased blood flow. The possibility of the changes in volume of an extremity being due to reactions on the venous side of the vascular bed has been indicated in studies where the necessary correlations between volume and flow could be made. A similar examination of these relations in any skin region may be effected by photoelectric plethysmography. The necessary data are available in the photoelectric plethysmogram since the simultaneous changes in blood content and blood flow can be estimated through the calibration of the photoelectric plethysmogram.

This paper describes, first, the application of the photoelectric plethysmograph to the estimation of changes in blood content and of the level of the blood flow in the skin, second, the correlations between flow and volume changes; third, the use of these correlations in estimating the directional changes in arterial and venous tone, fourth, the estimation of the blood depot in the minute vessels of the skin.

Summary

1. The estimation of the blood content and the blood flow in the skin by use of the photoelectric plethysmograph is described and analyzed.

2. It is demonstrated that during spontaneous or induced constrictions in the finger pad, blood content and blood flow vary in the same direction and in an approximately linear fashion. Calculations show that a change in rate of flow of 0.10 cc./cm./ min. is accompanied by a corresponding change in blood content of 0.0012 cc./ cm. of skin. Evidence is presented to demonstrate that the relative value of the ratio of volume change to flow change may be employed to study the possibility of changes in venous tone occurring during vascular reactions. That is, large deviations in the value of this ratio from the mean would imply large or disproportionate changes in tone of the small veins.

3. Vasomotor reflexes in forearm skin are relatively less effective on flow than those occurring in the finger pad. The ratio of change in blood content to change in blood flow is about thirteen times as great as in the finger pad. It is suggested that these changes in blood content are due to changes in tone of small veins and venules in the skin.

4. Studies on forehead skin show a ratio which is greatly in excess of that demonstrated in the finger pad. Absence of arterial vasoconstrictor reflexes in the forehead skin suggest that constrictions occurring in this region (as a result of exposure to low temperatures) are due to direct effects of the cold on the small arteries and veins (arterioles and venules).

5. The estimation of the quantity of blood in the minute vessels of the skin is discussed. Calculations from data presented show that the total quantity of blood normally present in these vessels is relatively small.

6. The unreliability of dependence upon the intensity of skin color as determined by blood content of the subpapillary venous plexus in the estimation of the skin flow is discussed.

Bed Exercises Send Them Home Sooner

Nila K. Covalt, M.D. In THE MODERN HOSPITAL, 68:6:60, June 1947.

Three other factors can also assist in shortening a patient's hospital stay and are in themselves specific forms of therapy.

The first of these is the teaching of correct bed postures to all patients immediately after admission to the hospital.

The second factor is to have all patients taught relaxation, which is a form of muscle reeducation.

The third factor is the teaching of bed exercises. These are one form of therapeutic exercises. When used correctly, they have a twofold purpose: (1) to assist in keeping up the general tone of all muscles; (2) to strengthen certain muscles which have been injured or weakened by disease owing to prolonged bed rest or which have suffered injury as a result of specific surgical procedures.

If there is a physical therapy department in the hospital, a small remedial gymnasium located beside the treatment room can be of great assistance for semi-ambulant, ambulant and long term patients. However, if there is no such department, hallways, open wards and sun porches can be utilized. Group exercises can be done in these locations also, since, even with individual prescriptions, many of the exercises will be applicable to an entire ward.

Flexor-Tendon Grafts to the Finger and Thumb

Walter C. Graham, M.D., Santa Barbara, California. In JOURNAL OF BONE AND JOINT SURGERY, 29:3:553, July 1947.

The loss of the flexor tendon to a finger or thumb handicaps greatly the function of the hand. When the flexor tendons have been cut, there is loss of both the pinch and hook mechanisms of the fingers, as well as of the ability to grasp and to hold objects. It is obvious that the most logical treatment is a restoration of the flexor-tendon function to the finger or thumb. When a flexor tendon has been cut for some time, the proximal end will retract into the palm of the hand, so that it is impossible to do an end-to-end anastomosis. Any excess scar through which the tendon glides will inhibit function of the tendon, unless it is completely excised and replaced by healthy, viable tissue. There is no reason to attempt to restore flexor-tendon function to a finger which has no sensation, because there is a tendency for the patient to substitute a finger with normal sensation in preference to using the one which has been grafted. To restore function to a finger requires a tremendous effort on the part of the patient, and he must use the finger to recover the tendon action. The views relating to this problem are based upon experiences gained in 141 flexor-tendon grafts. The methods advocated have been found to yield gratifying results in suitable cases.

Conclusions

1. In a severely scarred finger, fusion of the distal interphalangeal joint is frequently preferable to an attempt to restore flexor-tendon function. If the finger has good sensation and good joint function, a flexor-tendon graft will restore useful function.

2. The graft should be dissected out, to retain the gliding material on the tendon.

3. The restoration of function requires constant effort on the part of the operator in the form of encouragement and personal supervision of the mobilization of the tendon.

Reablement of Children with Infantile Cerebral Palsy

Eirene Collis, C.P.T., M.C.S.P., M.A.O.T. In THE LANCET, No. 6468:239, August 16, 1947.

The term "infantile cerebral palsy" covers the various types of sensorimotor disabilities formerly loosely called "spastic paralysis and allied conditions." The term "spastic paralysis" is often a dual misnomer: "spastic" should be applied only to upper-motor-neurone lesions with true spasticity; and in upper-motor-neurone lesions the term "paralysis" is not strictly applicable.

In the reablement of children with infantile cerebral palsy, paralysis is defined as inability to contract muscle for the reason that the muscle is completely cut off from nervous control. Cerebral palsy, on the other hand, is dysfunction of movement due to a cerebral lesion interfering with one or more of the several pathways directly concerned with normal human movement.

Training

Training is instituted as follows, all measures overlapping to form a whole rehabilitation scheme:

(1) Physical therapy
(2) Everyday activities
(3) Occupational therapy
(4) Speech therapy
(5) School or kindergarten work

Physical therapy includes the following measures:

(1) Functional examination, designed to discover the present ability of the child in ordinary life—e.g., ability to sit on a chair and to gain a standing position.

(2) Athetoid or spastic motor examination (according to classification) to discover the range of voluntary motion and control present, and the limitations imposed by the disability in respect of each part.

(3) Respiratory and deglutition training.

(4) Removal of faulty habit patterns.

(5) Establishment of correct motor patterns through trained motion according to analyses made.

(6) Balance—equilibration and muscle balance training.

(7) Voluntary postural correction.

(8) Special sense training.

Everyday activities consist of motion learned in physical therapy practically applied—e.g., hopping, ball-throwing, eurhythmy, and group work, such as rhythm band and games of all kinds.

Occupational therapy consists of movement learned in physical therapy applied to the use of material—e.g., self-feeding, dressing, brick-building, typewriting, and group work, such as gardening, care of animals.

Shoulder and Elbow Lesions Distinctive of Baseball Players

George E. Bennett, M.D., Baltimore, Md. In ANNALS OF SURGERY, 126:1:107, July 1947.

The professional baseball player is a human being, not a superman and susceptible to all of the common lesions of the shoulder which we see in the nonball player, namely, subacromion and subdeltoid bursitis, irritation of the supraspinatus and biceps tendons, traumatic synovitis and inflammatory disease. Fortunately, these conditions form the largest group and respond well to rest, heat and general orthodox treatment. Because a man is a ball player does not mean that he cannot have abscessed teeth, infected tonsils, or other foci of infection; therefore, his general health should be thoroughly investigated, just as one does when in search of some obscure etiologic factor in joint lesions.

His occupation is such, however, that aside from these common joint complaints he develops distinctive lesions. One which has been definitely identified and, to my knowledge, is nonexistent in other occupations, is a deposit on the posterior and inferior margin of the glenoid fossa, on or about the attachment of the triceps tendon.

The second lesion is a fraying of the supraspinatus tendon, which I do not think we can class as distinctive, because one sees it in individuals engaged in other occupations. The constant snubbing of the supraspinatus tendon over the head of the humerus and the greater tuberosity results in a gradual fraying of the deeper structures of the supraspinatus tendon.

Rate of Regeneration of Sensory Nerve Fibers

Sydney Sunderland, M.D., D.Sc., Melbourne, Australia. IN ARCHIVES OF NEUROLOGY AND PSYCHIATRY, 58:1:7, July 1947.

This paper is concerned with the rate of regeneration of sensory fibers, calculated on the basis of the rate of advance of Tinel's sign, during the recovery of injured peripheral nerves. Though it is generally accepted that the eliciting of Tinel's sign is evidence of the presence of "young axis-cylinders in the process of regeneration," there has been no histologic confirmation of the structure of the fiber at the site of percussion. The present account is not concerned either with the morphologic features of the recovering nerve fiber or with the prognostic significance of the sign, but is confined to a consideration of the rate at which it advances.

Summary

Observations on the rate of advance of Tinel's sign demonstrate that after suture in the proximal part of the limb regenerating sensory fibers advance at a progressively diminishing rate, which in the initial stages may be as great as 3 mm. per day. It gradually slows until it reaches a value of approximately 0.5 mm. per day over the terminal stages of recovery.

Control of Interference Caused by Diathermy Equipment

Current Comment. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 134:17:1486, August 23, 1947.

More than ten years ago the Federal Communications Commission was requested by radio communication agencies to formulate regulations to control the interference caused by diathermy equipment. On May 9, 1947, the commission released Public Notice number 7722, which document assigned three frequency channels for medical diathermy. The channels are 13.66, 27.33 and 40.98 megacycles in arithmetic progression and correspond to wavelengths of 22, 11 and 7½ meters, respectively, in harmonic progression. The widths of the channels are approximately 15, 320 and 40 kilocycles.

A physician owning and operating a diathermy apparatus manufactured prior to July 1, 1947, may continue to operate for a period of five years, provided the equipment does not interfere with authorized radio services. If interference is reported, the physician is responsible for eliminating the disturbance to radio communications. This may be accomplished in some instances by readjusting the existing diathermy appliance. If no means can be provided to eliminate the interference, the physician becomes subject to the new rules and regulations. That is, he must screen his present apparatus or acquire frequency controlled equipment.

Whirlpool Baths in a General Hospital

Capt. Louis N. Rudin (MC), A.U.S. In THE MILITARY SURGEON, 101:2:125, August 1947.

Whirlpool baths are the most widely used hydrotherapeutic agents in physical therapy departments of army general hospitals. Whirlpool baths produce a marked hyperemia of the part treated due to: (1) Local effects of the hot water. (2) Mild massage by the rushing stream of air and water. (3) Reflex vasodilatation of the part, due to stimulation of the sympathetic nervous system.

Two types of whirlpool baths are available: the continuous flow, for arms and legs, and the turbine type for arms, legs, and whole body (Hubbard tank).

Summary

1. Whirlpool baths are important therapeutic agents in the treatment of many surgical conditions encountered in a general hospital.
2. The therapeutic effects are due mainly to an induced hyperemia and mild massage.
3. The most effective type of apparatus is the turbine driven whirlpool bath.
4. Underwater exercise tanks are fairly efficient in the production and maintenance of mild fever (103-104 F.).
5. Whirlpool baths are not curative in themselves, but they are important adjuncts to the proper surgical and medical management of patients.

Nerve Injuries Affecting the Hand

Nils L. Eckhoff, F.R.C.S., Surgeon to Guy's Hospital. In THE CLINICAL JOURNAL, No. 2097, July-August 1947.

The diagnosis of a simple nerve injury in the hand seems to puzzle the vast majority of students. Such a lesion is of immense importance to the patient, for the fate of the hand as a useful member may depend upon it. Nor is it of lesser importance to the student, for his fate in the examination hall may likewise depend upon it. I hope to be able to clarify some of the problems for you.

In addition to inspection of the hand, and tests for motor function and anesthesia to cotton-wool, it is important to record accurately the loss to pinprick (analgesia) and the loss of sweating (anhidrosis). It is convenient to mark the anesthesia with a continuous line of Indian ink, analgesia with a dotted line, then dust the hand with the following powder:

Sodium chinizarin 2-6 disulphonate	28 gr.
Anhydrous sodium bicarbonate	24 gr.
Rice starch	48 gr.

and induce sweating by giving the patient aspirin gr. 10, a cup of hot tea and a radiant heat bath. The anhidrotic area remains pale while the normal area becomes reddish purple. The hand is then photographed for record purposes. The area of loss of sweating corresponds fairly accurately with the area of anesthesia, while the area of analgesia is somewhat smaller.

Treatment

Massage.—Deep massage over a paralyzed muscle can only do harm. Light effleurage may be permitted to maintain mobility of the muscle fibres.

Galvanism.—There is considerable difference of opinion over the value of galvanic stimulation. Some maintain that it is harmful, others that it diminishes muscle wasting and aids recovery. I think most people prescribe it. Patients certainly think it is doing them good when they can see the muscle contracting.

Splinting.—All agree that it is paramount to support paralyzed muscles to keep them from being stretched. Splints are designed for each type of palsy. For ulnar palsy the metacarpophalangeal joints must be kept flexed, to prevent harmful stretching of the intrinsics. For medium palsy the thumb is held in front of the index metacarpal, and then well abducted, to relax the opponens and short abductor. For radial palsy the wrist and metacarpophalangeal joints should be held in extension—but *not* the interphalangeal joints. The old fish server cock-up splint is an abomination, and I can think of no condition in which it is required. In radial palsy —or in burns—one has seen far too many hands ruined by keeping the fingers in extension, where they so rapidly get stiff, for which there is practically no cure.

By the same token let me remind you that the application of a splint does not indicate immobilization. Far from it. The joints must be put through their full range twice a day. Better still, it is possible with all these splints to arrange for elastic reaction to take the place of, and act like, the palsied muscles. This not only keeps the joints moving, but gives the antagonists something to work against.

Occupational therapy is designed specially for each type of palsy, and can well be executed with the splints in position.

History of Treatment of Poliomyelitis

Ralph K. Ghormley. M.D., Rochester, Minn. In JOURNAL OF THE IOWA STATE MEDICAL SOCIETY, 37:8:343, August 1947.

A statement in the introduction to the book on infantile paralysis by Pohl and co-author has prompted the preparation of this review. That statement is as follows: "Tradition has regarded infantile paralysis as a disease whose main characteristic was that the connection between the muscles and the central nervous system was interrupted and tended to disappear. No more was known than that." On such a premise almost any type of case could be built. As a matter of fact, if one explores the American literature one will find a great amount of information, much of which has been overlooked or forgotten. I believe that the disease has been studied in this country in a more thorough manner than in any other country. This information cannot be overlooked entirely.

Conclusions

I have attempted to show from excerpts from the literature of the past fifty years that the story of anterior poliomyelitis has been told over and over again and that the literature emphasizes the fact that the disease is a complex one with great variations in its symptomatology and in its clinical manifestations. Such variations are noted not only from epidemic to epidemic but from case to case within the same epidemic.

Salient Observations on Physical Medicine in the Service

Herman L. Rudolph, M.D., Reading Pa. In ARCHIVES OF PHYSICAL MEDICINE, 28:10:636, October 1947.

The pleasant association with many physical therapists from all walks of life, from all sections of the country, graduates of most of the approved schools, will remain as an outstanding life-long remembrance of service during the war. As a group, there is probably none which has served with greater devotion to duty, attention to detail, cooperation with authority and sense of responsi-

bility to patient and medical officer. The critical shortage of trained physical therapists was never entirely relieved during hostilities and for some time thereafter, so that the work load was always heavy and strenuous. All have heard and read of the remarkable degree of resourcefulness and ingenuity at improvisation displayed by physical therapists assigned to overseas installations, where facilities for physical therapy often were necessarily limited.

Exigencies of war necessitated the accelerated programs of recruitment and training of qualified therapists to supply the acute needs in both physical therapy and occupational therapy. Fortunately, the prerequisite qualifications for admission to the emergency courses were maintained at the former high levels. As was to be expected of all accelerated programs, the qualifications of graduates were noticeably limited in certain instances. It is true that to a certain extent the vast experience during the war served to balance somewhat the deficiencies inherent in accelerated training programs. It must be noted, however, that experience often can serve no good purpose, since "we make the same mistakes a hundred times and call it experience."

It is encouraging to note that most therapists are appreciative of the limitations of an accelerated training program. Initial enthusiasms were noted to become tempered with a realization of certain deficiencies in training, and the consideration of the future is approached with hesitancy and diffidence induced by cognizance of lack of training and experience in such conditions as spastic paralysis, poliomyelitis, and other diseases of the young and the old. Most therapists have demonstrated an exceptional anxiety to learn and to be better informed. Many are seeking information regarding refresher courses and postgraduate work but find it difficult to secure the detailed information pertaining to facilities available for professional rehabilitation and further training. It would seem that schools which participated in the accelerated training programs would find it beneficial to their ratings to maintain closer liaison with their graduates for the purpose of encouraging qualifications as high as those required of past and future graduates.

It is apparent that the little publicity given to refresher and postgraduate instruction should be greatly intensified, not only for the purpose of elucidating the several programs available but also as a means of encouraging further study.

The shortage of qualified therapists remained an acute problem during the entire period of hostilities, necessitating the assistance of untrained and unqualified enlisted men and, during the latter part of the war, a number of enlisted WAC technicians who were given several weeks of didactic and practical training. Experience has demonstrated that with a conscientious endeavor to train enlisted personnel with a few of the fundamentals by classwork, demonstration and increasing experience, it was possible to secure a group which for interest, loyalty and devotion to duty compared favorably with the others. It is granted that the utilization of this type of personnel was a far cry from the expectations of qualified commissioned therapists. There is reason to expect that an era of unqualified practitioners will present itself, involving as great a problem as that reported after the First World War.

It seems that medicine is already overburdened with cults, irregular practitioners and others entering through the back door of practice. Now that physical medicine has secured a firm foothold for its establishment as a special field of medicine, it would seem disadvantageous to be held responsible for any added burden. The problem is presented with the belief that it merits concerted attention and action.

Some Applications of Psychiatry in General Medicine

Dale Groom, M.D., Rochester, Minn. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 135:7:403, October 18, 1947.

The internist or general physician, in dealing with the common psychogenic illnesses of his patients, has several advantages over the psychiatrist: he generally sees them in earlier stages when they are more amenable to treatment, he is in a better position to relate symptoms to the overall somatic status, and he can approach the patient as an internist rather than as a psychiatrist. Only a small percentage of neurotic patients can be or need to be seen by the psychiatrist. The majority of them, including the many new thousands who appear as part of the aftermath of war, will continue to be treated by physicians in other fields of medicine. And it is becoming increasingly apparent that a greater integration of basic psychiatric concepts with the general practice of medicine is essential if the average physician is to manage effectively this "other 50 per cent" of his medical practice. For the psychiatrist who attempted to practice without an adequate knowledge of general medical principles would be no more vulnerable to gross errors of diagnosis and management than would the internist who had only a vague acquaintance with fundamental psychiatric principles.

The Aim of Psychotherapy.—Since neurotic symptoms are fundamentally regressive, irrational, protective substitutions for the real problems which produce them, the aim of psychotherapy is to help the patient back to reality. He must achieve a more mature method of dealing with reality rather than escaping into neurosis. Attempts to substitute the physician's methods, or those of a relative or creed or cult—a sort of mental antitoxin—leave him little lasting benefit. Ideally, the patient should be helped to find his own way, a way commensurate with his abilities and his standards, by relieving him of disabling emotional handicaps. He must learn to use his inherent adaptive mechanisms in coping with reality if he is to gain active rather than a passive immunity to his neurosis.

More than any other form of therapy, psychotherapy must be individualized. To be rational it must be based on an adequate understanding of the psychopathologic condition being treated. Various avenues of psychotherapy are available to the physician:

Supportive psychotherapy.
Manipulative psychotherapy.
Release of malignant tensions.
Explanatory psychotherapy—Once the mechanisms of a neurosis have been ascertained, the judicious explanation of them provides the patient with some degree of insight into the nature and origins of his illness.

Some generalizations as to prognosis in organic disease are often applicable to mental illness. The duration of the neurosis may determine the ultimate results of treatment; the more long standing the symptom pattern, the more fixed it becomes and the more deep rooted and numerous the secondary changes likely to take place in the personality. These may eventually render the original disorder inaccessible, if not obscure. Also, the amount of stress necessary to produce the disorder—whether it was cumulative or acute stress—is often a rough measure

of the treatment necessary to restore equilibrium. Particularly, the patient's personality assets are of prognostic significance, including his intelligence, his emotional maturity and especially his inherent stability as judged by his previous performance and achievements. The person who has been able to achieve adequate social, occupational and marital adjustment in the past logically can be expected to have a far better prognosis than the one who has lived on the ragged edge of security in constant conflict with his environment.

The Neurologist Looks at Discipline

Roland P. Mackay, M.D., Chicago, Ill. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 135:7:399, October 18, 1947.

The problem of the individual—how man can live in happiness with himself—is to be resolved. It has been said that ours is a uniquely neurotic time in history. Whether this be true or not, ours is indeed an age of unreason, with its conflict and bitterness, its fears and hatreds in peace, even greater than in war, its starvation amid plenty, its keen personal discontents.

Now, while the neurologist makes no pretense to a comprehensive solution of the ills of mankind, he does know that the great trouble with the world lies in the perversity and contrariety of human behavior. He can testify, further, that these perversities arise not from intellectual but from emotional forces in the individual. Virtue is not born of knowledge, nor vice of ignorance. In the words of Shakespeare: "If to do were as easy to know what were good to do, chapels had been churches, and poor men's cottages princes' palaces." The determinative emotional forces in behavior are compounded out of the original self-preservative and race-preservative impulses of the individual. If they are deformed into patterns of fear and hatred and aggression, it is not in formal education, but in the complex personal impact of parent and society on the child.

Fortunately, we are no longer dependent on empiric systems such as theology, sociology, armchair philosophy or even couch psychoanalysis for our understanding of the processes of learning and the establishment of the neuroses.

As the reflex arc is the physiologic unit of the nervous system, so the conditioned reflex is the physiologic unit of character. From the work of Pavlov and many others we have learned some of the laws by which original or instinctive responses expand and flower into the complicated "acquired" behavior of the organism. These laws are so constant and verifiable that they must apply with equal force to the human being, albeit in greater complexity. What is even more important, we have learned some of the circumstances in which neuroses may be experimentally produced in an animal during the establishment of conditioned reflexes—neuroses which exhibit in simple form many of the characteristics of the human neuroses. Many of the laws governing these processes are well known and cannot be ignored in any theory of human behavior.

It is the purpose of this discussion to examine a few of these principles and to apply them to the problem of the discipline of children. One fact, as it were an axiom, is essential to our discussion: viz., that it makes a great difference whether and how we discipline our children. It is strange, but there are those who still hold to a doctrine of "maturation"—the theory that children simply mature into well adjusted adults if left alone, the process by which Topsy "just growed." This hypothesis, perhaps attributable in part to John Dewey, may hold for bees but certainly not for boys and girls.

Rheumatic Diseases: A Challenge and an Opportunity

Professor Henry Cohen, M.D., F.R.C.P. In PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE, 40:8:443, June 1947.

In planning a service for rheumatic disease which shall form part of a National Health Service we have to bear in mind: (1) The paramount need for accurate diagnosis; (2) the parallel pursuit of clinical and basic research into the problems of rheumatism especially prophylaxis; (3) the provision of staff, and hospital beds in which patients may remain if need be for months in order to ensure that all the necessary treatment can be given; (4) the setting-up of clinics near the homes of patients or near their places of employment where minor forms of rheumatism can be treated and where those who have earlier been hospitalized can continue physical therapy.

It is in brief suggested that:

(1) The teaching hospitals and a number of major general hospitals shall act as diagnostic and research centers.

(2) Each of these centers will be linked on the one side with one or more out-patient clinics with adequate facilities for physical therapy of most forms, and on the other with a base hospital providing long-stay beds and all necessary medical and surgical treatment, including occupational therapy and rehabilitation, for the chronic patient.

(3) Each diagnostic center will provide the short-stay beds for investigation (it is unlikely that circumstances will free hospital beds in the diagnostic center for long-stay patients) and also an out-patient clinic, though where more convenient the patient may be referred to one of the associated clinics.

(4) Patients will be referred by their family physician, or by a works' physician after consultation with the family physician, to out-patient clinics in the first instance.

(5) Base hospitals will care for long-stay cases referred for treatment by associated diagnostic centers; some will have out-patient departments and they too will refer doubtful or intractable cases to an associated diagnostic center.

Studies of Thermal Injury I. The Conduction of Heat to and Through Skin and the Temperatures Attained Therein: A Theoretical and an Experimental Investigation

F. C. Henriques, Jr., Ph.D., and A. R. Moritz, M.D. From the Dept. of Legal Medicine, Harvard Medical School, Boston, Mass. In AMERICAN JOURNAL OF PATHOLOGY, 23:4:531, July 1947.

Never before in the history of man has heat energy been so important a cause of disability and death as during World War II. The need for precise knowledge regarding the thermal tolerances of living tissue and the nature of the cellular and somatic changes induced by hyperthermia was felt by those responsible not only for the protection and medical care of our own military personnel but also for the development and use of such thermally effective weapons as the flame thrower, the atomic bomb, and various other incendiary or explosive missiles.

Although thermal injury has always constituted a problem of medical importance, the requests of various branches of the Armed Forces for precise and quantitative information disclosed a dearth of basic facts relating to the casualty-producing effectiveness of heat

energy. Remarkably little information was available concerning the mechanism by which hyperthermia leads to irreversible cellular injury, the reciprocal relationships of time and temperature in the production of either cutaneous or systemic injury, the relationship between environmental heat, surface temperature and the slope of the transcutaneous thermal gradient, the pathogenesis of cutaneous burns, or the physiological mechanisms by which external heat may be responsible for acute disability or death.

In an attempt to elucidate some of these problems and to satisfy some of the more pressing needs of the Armed Services for quantitative data, a series of studies was undertaken.

Summary

The various physical factors which determine the transfer of heat energy to and through the skin and the temperatures attained thereby have been defined and discussed. A general theory of heat flow, which enabled the estimation of the time-temperature relationships within the epidermis during exposure to heat, was developed.

The thermal conductivities and heat capacities of epidermis, dermis, and subcutaneous fat and muscle were measured in vitro.

Experimental observations pertaining to the rate at which thermal energy is taken up by the skin, during surface exposures of varying intensity, and the subsurface thermal gradients established therein, have been presented.

The time-temperature relationship at the dermal-epidermal junction was computed under two greatly different experimental conditions: (i) when the skin surface temperature was immediately brought to, and maintained at, the temperature of the heat source, and (ii) when the entire skin surface was exposed to specified circumambient and circumradiant temperatures. These data indicate the extreme importance of the mode of applying heat to the skin surface in the time-temperature relationships within the epidermis.

Local Sweat Gland Activity Due to Direct Effects of Radiant Heat

Walter C. Randall. From the Dept. of Physiology, St. Louis University School of Medicine, St. Louis, Mo. In AMERICAN JOURNAL OF PHYSIOLOGY, 150:2:365, August 1, 1947.

During a series of experiments designed to study the reflex sweating patterns induced by application of intense radiant heat to a relatively small area of skin, marked differences were observed in the size of sweat spots in the areas of highest and lowest temperatures. Sweat spots in the heated areas were distinctly larger and darker than those in adjacent, peripheral areas, indicating much greater sweat secretion by individual glands in the areas of high temperature. The smaller, lighter spots in the periphery were quite comparable in appearance to those elicited during normal reflex sweating. Sweat spots comparable in size to those in the area of high temperature are seldom observed in normal sweating except in specific areas of the body (axilla, etc.), or under conditions of maximal stimulation (very hot tub-bath or stimulation by cholinergic drugs, Randall, 1946).

Such marked differences suggested the possibility of differential responses of individual sweat glands to direct heating and to stimulation by reflex paths.

Summary

Using a method designed to investigate activity of individual sweat glands, the sweating responses to locally applied radiant heat were studied. When the temperature at the skin surface was rapidly elevated to high levels (39 to 45 C), large sweat spots appeared in the heated area, indicating excessive sweat responses by the individual glands. These spots contrasted sharply in size with those induced by normal reflex stimulation. A definite threshold temperature appears to exist, above which a direct response to local heat may occur and below which it does not occur. This threshold appears to lie within a rather wide range of temperatures and the range of variation does not appear significantly different in summer and winter. Pharmacological evidence is presented to suggest that the profuse sweating response of individual glands to extreme temperatures is a direct one in contrast to the usual diffuse reflex response.

The Physical Treatment of Mental Illness

Arthur Pool, M.B., Ch.B., M.R.C.P., D.P.M. Physician-Superintendent, The Retreat, York. In BRITISH JOURNAL OF PHYSICAL MEDICINE, 10:4:106, July-August 1947.

The only method of physical therapy used in the early days of the Retreat (and still finding a large place in the present-day therapy) was the *warm sedative bath*.

Hydrotherapy methods have developed during the intervening years, and they are still effectively used in the treatment of nervous and mental illness. Colonic lavage and the continuous bath are the main hydrotherapy measures—the former invaluable in toxic psychoses associated with intestinal stasis and constipation, the latter one of the most soothing measures for the acute agitation and restlessness of melancholia and mania.

The *continuous bath* is a bath, larger than the usual household bath, with an inflow controlled by a mixing apparatus so that the hot and the cold supply are mixed to achieve an adequate temperature (usually 100-104 F.) and the effluent pipe so regulated that the water level can be kept fairly constant. Some patients take to the continuous bath "like a duck to water", and for these it will soon prove a sedative measure. Others object to it from the onset, and any attempt at coercion will only defeat the object of allaying restlessness and agitation.

Occupational Therapy

Until von Jauregg of Vienna introduced the malarial treatment of general paralysis in 1917, medical treatment in the psychoses and neuroses was limited to dietary, hydrotherapy and recreational and occupational therapy.

From these early efforts has developed modern occupational therapy, which provides the main background to the daily life of the hospital.

Short-wave Diathermy (Inductothermy)

One of the most important pieces of apparatus from the standpoint of physical therapy is the inductotherm. This apparatus, working on the principle of short-wave alternating current, serves a multitude of purposes. The fact that a patient enters hospital with a psychosis or neurosis does not preclude the possibility of that patient suffering from an arthritis, fibrositis, or other rheumatic ailment. We believe that, while the main treatment should be directed towards the mental state, it is good therapy to deal with all the minor "ills that flesh is heir to". Accordingly many patients are referred to the

physical therapist (a trained physical therapist and mental nurse) for local heat treatment and massage.

The method also is employed more specifically in cases of protracted insomnia by the application of gentle massage and heat to the head. This treatment is usually carried out in the evening between 7 and 9 p.m., and in selected cases is very effective.

It is a machine of a hundred uses and is perhaps the most hard-worked piece of apparatus in the hospital. In an appended list are a number of cases treated by inductothermy recently, indicating the range of usefulness of this particular machine.

Book Reviews

Diseases of the Basal Ganglia and Subthalamic Nuclei. *By D. Denny-Brown, M.D., C.H.B., Dr.Phil., Professor of Neurology, Harvard University, Boston. Edited by Henry A. Christian, A.M., M.D., LL.D. Cloth. Price, $2.50. Pp. 113. Oxford University Press, 114 Fifth Ave., New York 11, 1946.*

This is a monograph reprinted from the Oxford Loose-Leaf Medicine and as such has been confined to a brief discussion of anatomy and physiology with a more detailed clinical-pathologic review. The first parts dealing with anatomy, physiology and focal lesions in the basal ganglia in man are quite concise and perhaps suffer somewhat from their brevity. Amplification of the studies revealed by surgical intervention in man could make this more lucid for the average reader.

The various disease entities considered include the various types of Parkinsonism, hepato-lenticular degeneration, dystonia musculorum deformans, double athetosis, progressive rigidity with athetosis, and Huntington's chorea. The description of these diseases is masterful and lucid. The various differential points are well brought out and the relationship of the cases described in the literature is clarified. The bibliography is extensive. There are too few illustrations but undoubtedly the author's space was limited. Pictures of the pathology and even clinical appearances would make this a more valuable reference book. It is highly recommended even in its present form to every neurologist.

My Polio Past. *By Noreen Linduska. Cloth. Price, $2.75. Pp. 205. Pellegrini and Cudahy, 75 E. Wacker Drive, Chicago 1, 1947.*

This is a gay and moving story of the author's fight against poliomyelitis. It has a message for anyone who needs faith and inspiration to overcome physical disability. Like Helen Keller and Betsy Barton, this saucy, pretty, young girl finds in physical suffering a way to build a happy, full life. It is a book that physical therapists can recommend to their patients.

What Is Heart Disease: A Handbook for the Heart Patient. *By William Hyatt Gordon, M.D., F.A.C.P., Head of the Medical Section, Lubbock Memorial Hospital and Clinic, Lubbock, Texas. Cloth. Price, $2.50. Pp. 114. Grune and Stratton, 381 Fourth Avenue, New York 16, 1946.*

It is important for the patient with heart trouble to have an understanding of his condition. He needs to know more than that he has a clot, a murmur or a scarred valve. This is especially true if he has but a vague idea of where the clot is or what a valve looks like. He should be made to realize that many affections of the heart do not necessitate a change in his activities and that they will not materially shorten his life.

This book should be read by all patients having a heart disease. It will give the patient and his physician a common meeting ground.

Hospital Care in the United States. *By Commission on Hospital Care. Cloth. Price, $4.50. Pp. 631. The Commonwealth Fund, 41 East 57th St., New York 22, 1947.*

This is a study of the function of the general hospital, its role in the care of all types of illness and the conduct of activities related to patient service with recommendations for its extension and integration for more adequate care of the American public. Physical therapists will find this an excellent book for reference.

Under rehabilitation programs it states: "Hospitals should provide those facilities and services which will aid in restoring the patient to as full a measure of physical and mental health as possible and in eliminating or substantially reducing his disabilities as handicaps to employment. Rehabilitation services should include physical, psychological and occupational therapy administered under skilful professional and technical direction.

"Hospitals should assist in the establishment of or should correlate their services with community centers through which all types of rehabilitation services are made available to the disabled individual to enable him to achieve the maximum restoration to normal health and function."

The factual material assembled in this book and its thought-provoking recommendations make this report an invaluable reference book for all those concerned with hospital administration.

A Guide to the History of Physical Education. *By Fred Eugene Leonard, A.M., M.D., Late Professor of Hygiene and Physical Education in Oberlin College, Oberlin, Ohio. Third edition, revised and enlarged by George B. Affleck, A.M., M.P.E., formerly Director, Health and Physical Education Division, Springfield College, Springfield, Mass. Cloth. Price, $5.50. Pp. 480, illustrated with 121 engravings. Lea & Febiger, Washington Square, Philadelphia 6, 1947.*

Present chaotic conditions render it difficult to secure authoritative information especially from abroad. So the author frankly says that this edition "makes no claim to completeness, but simply aims to bring up-to-date significant facts concerning the development of the subject through selected organizations in various countries and to indicate the main contributions to the profession of certain leaders and their successors during the last twenty years."

The book describes the growth and the varying ideas of physical education from the times of the early Greeks and Romans down to the latter-day movements in Denmark, Sweden, Germany and England. The development of physical education in our own country is described in the American colleges and universities and in the Y.M.C.A. The playground movement in America and the training of teachers are described. It presents brief biographies of some of the more important pioneers.

The text gives thorough, painstaking, historical research of the highest order. The material, with the numerous monographs referred to in its bibliography provides a study from which many further studies can be made. Everyone interested in the history of physical education should read this book. Physical therapists will find it most interesting.

The American Illustrated Medical Dictionary. *By W. A. Newman Dorland, A.M., M.D., F.A.C.S., Lt. Col. M.R.C., U. S. Army, Member of the Committee on Nomenclature and Classification of Diseases of the American Medical Association. With the collaboration of E. C. L. Miller, M.D., Medical College of Virginia. Twenty-first edition. Cloth. Price $8 without thumb index; $8.50 with thumb index. Pp. 1660, with 880 illustrations, including 233 portraits. W. B. Saunders Company, West Washington Square, Philadelphia, 1947.*

This dictionary covers as completely as possible the voluminous additions to medical terminology resulting from the research and discovery of the war years. Besides the field of actual war medicine and surgery these additions are rich in the specialties of tropical medicine, aviation medicine, medical zoology and mycology, biochemistry and pharmacology, enzymes, vitamins and endocrines, physics and neucleonics, including the medical applications of radioactive isotopes of the chemical elements.

A careful study has been made of the names of proprietary medicines which have accumulated in the previous editions. Great numbers have become obsolete and therefore have been eliminated from the present edition.

This is an outstanding and complete dictionary of the terms used in medicine, surgery, dentistry, pharmacy, chemistry, nursing, veterinary science, biology and medical biography.

When Your Child Has Infantile Paralysis: Suggestions for Parents. *By the National Foundation for Infantile Paralysis. Paper. Pp. 36. The National Foundation for Infantile Paralysis, 120 Broadway, New York 5, 1947.*

This new publication is of assistance to those parents who need help in understanding the complexity of necessary medical services and what the professional groups involved in these services contribute to children with poliomyelitis. It should be read by the parents of every child with infantile paralysis.

Anatomy and Physiology for Students of Physiotherapy, Occupational Therapy and Gymnastics. *By C. F. V. Smout, M.D., M.R.C.S., L.R.C.P., Assistant Professor of Anatomy, University of Birmingham, Examiner to the Chartered Society of Physiotherapy, and R. J. S. McDowall, M.D., D.Sc., Professor of Physiology, University of London, King's College. Second edition. Cloth. Price, $8. Pp. 470, with 318 illustrations. The Williams and Wilkins Company, Mt. Royal and Guilford Aves., Baltimore 2, Md.*

The book, according to the authors, is planned in strict accordance with the Syllabus of the Chartered Society of Physiotherapy. It has been "Written in the hope that it may supply a long felt need for a textbook dealing with anatomy and physiology from the viewpoint of the student of massage and medical gymnastics. The occupational therapists have expressed a desire to be included and fortunately it has been found possible to cover the curriculum of both these important ancillaries to medical practice in one volume."

The American Medical Association requires for physical therapists 210 hours of anatomy and for occupational therapists 15 hours of biological sciences which includes anatomy and other subjects. Therefore this book could not serve both physical therapists and occupational therapists in anatomy. Also as it is planned in strict accordance with the Syllabus of the Chartered Society of Physiotherapy it cannot be recommended for students in the United States, as requirements are different.

A Manual of Fractures and Dislocations. *By Barbara Bartlett Stimson, A.B., M.D., Med. Sc. D., F.A.C.S., Assistant Professor of Clinical Orthopedic Surgery, College of Physicians and Surgeons, Columbia University, New York City; Associate Attending Surgeon, Presbyterian Hospital and Vanderbilt Clinic, New York City. Second edition. Cloth. Price, $3.25. Pp. 223, illustrated with 98 engravings. Lea & Febiger, Washington Square, Philadelphia, 1947.*

This handbook is intended for medical students, the author states, and so it is believed that this is a book that will be valuable to the physical therapist. In this edition many sections have been completely rewritten in an effort to bring the subject up-to-date. It gives the student of fractures and dislocations a guide to the wealth of material that is published in larger textbooks and articles which bewilder the student with their mass of detail. This gives the fundamental knowledge she may need without burdening her with the detailed information demanded of the expert.

Penicillin in Neurology. *By A. Earl Walker, M.D., Associate Professor of Neurological Surgery, University of Chicago, and Herbert C. Johnson, M.D., Resident Neurological Surgeon, University of Chicago. Cloth. Price, $5. Pp. 202. Charles C. Thomas, Springfield, Illinois, 1946.*

This monograph is a combination of considerable original work in the application of penicillin in neurology and the available literature to the time of publication which is given as May 1946. The first five chapters are the most valuable because they cover the fundamental subjects such as penicillin sensitivity and assay, administration methods and its appearance in the spinal fluid, toxicity and pathology due to various modes of administration. It comprises basic studies which will be amplified but not outdated. The latter part of the book presents the application of penicillin in the treatment of neurologic diseases. Although the high-lights have been mentioned it is obvious that the time elapsed since publication has produced sufficient material to warrant reconsideration of some subjects. The chapter on penicillin in the treatment of neurosyphilis is particularly inadequate at this time. There is a brief chapter on other antibiotics and the central nervous system.

The authors have presented their material clearly and briefly and are to be thanked for having brought the material together in an easily readable form so early after the discovery of penicillin. However, their latest reference, in an extensive bibliography, is dated 1945 and since then there is an even more voluminous literature which merits digest and analysis which detracts from the value of their work at this time.

A History of the American Medical Association, 1847 to 1947. *By Morris Fishbein, M.D., Editor, Journal of the American Medical Association. Cloth. Price, $10. Pp. 1226. W. B. Saunders Company, West Washington Square, Philadelphia, 1947.*

This book is written for the general audience as well as for the medical profession. It reviews the rise of this Association as a great organization. It refers to the campaigns to raise the standard of medical education, to eliminate quackery, nostrums and frauds in the medical field and to provide a wide distribution of a high quality of medical care.

Dr. Walter L. Bierring wrote the biographies of the presidents of the Association. The whole is interesting reading and is a notable contribution to the history and development of American medicine.

Physical Fitness Appraisal and Guidance. *By Thomas Kirk Cureton, Jr., M.A., M.P.E., Ph.D., Professor of Physical Education and Director of the Physical Fitness Research Laboratory of the University of Illinois at Urbana. Assisted by Frederick W. Kasch, B.S., M.S., Director of Physical Education at the Colleges of Medicine, Dentistry and Pharmacy of the University of Illinois at Chicago, and John Brown, B.S., Assistant Director of Physical Education, Colleges of Medicine, Dentistry and Pharmacy; W. G. Moss, M.S., Ph.D., Instructor in Physiology, College of Medicine, University of Illinois, Chicago. Cloth. Price, $6. Pp. 566, with 66 illustrations. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1947.*

The physician, as well as the layman, has long recognized the important influence of health levels on the productivity, social adjustment and happiness state of normal humans. Unfortunately the medical profession has given less consideration than warranted to the recognition, study and elevation of the health levels of normal individuals. Workers in the field of physical education, on the other hand, have long evaluated healthy humans in terms of cardiovascular, respiratory and neuromuscular performance under conditions of activity and stress as well as rest.

In the study set forth in this volume the authors have for the first time measured the cardiorespiratory efficiency, motor fitness and physiques of a group of first year medical students. The anticipated improvement in the ratings of low-score students by their participation in the physical education program of the Chicago colleges should demonstrate to these future physicians the value of properly prescribed physical exercise in effecting a state of more bouyant health.

This book fills a need for an interpretative book on physical fitness. The field of testing physical fitness has been in a state of confusion due partly to the rapid progress of the research work in this field. An attempt is made to integrate materials from these fields with materials from the literature of physiology, medicine and psychology. This gives a more unified picture of physical fitness than could be presented from any one field. The emphasis is appraisal and guidance, both from the health educator's point of view.

A Doctor in the House. *By Henry Pleasants, Jr., M.D. Cloth. Price, $3. Pp. 286. J. B. Lippincott Company, East Washington Square, Philadelphia 5, 1947.*

Humor and drama are engagingly compounded in this reminiscence of a medical career that began at the University of Pennsylvania Medical School and through years of general practice in and near Philadelphia which was interrupted only by an important overseas assignment in World War I.

Here are personal memories of giants in the medical profession whose innovations and discoveries live after them. Also there are play-by-play notes of some of the author's most startling cases. Doctor Pleasants has thoroughly enjoyed his hectic life as a trouble-shooting country doctor. In this book he makes you understand why. It should be read by young doctors, old doctors and everybody who has ever had a doctor in the house.

Annual Report of the Baruch Committee on Physical Medicine (April 1, 1945, to December 31, 1946). *Paper. Pp. 161, with 35 illustrations. Baruch Committee on Physical Medicine, New York City, 1946.*

This is an interesting report to all engaged in physical medicine. It contains the reports of the Columbia University College of Physicians and Surgeons; New York University College of Medicine; Medical College of Virginia; Massachusetts Institute of Technology; Harvard Medical School; University of Minnesota; University of Southern California; State University of Iowa; Marquette University; Washington University; University of Illinois and the George Washington University School of Medicine. The illustrations are excellent.

The Rehabilitation of the Injured. Volume II: Remedial Gymnastics. *By John H. C. Colson, Member of the Chartered Society of Physiotherapy and the Association of Occupational Therapists, Rehabilitation Officer, Birmingham Accident Hospital and Rehabilitation Center. Foreword by Sir Reginald Watson-Jones, B.Sc., M.Ch. Ortho., F.R.C.S. Cloth. Price, 30/ net. Pp. 556, with 439 illustrations. Cassell and Company, Ltd., 37-38 St. Andrews Hill, E.C. 4, London, England, 1947.*

This is the second volume in a series of textbooks on the "Rehabilitation of the Injured." It deals with specific remedial exercises and is not concerned with general exercises, games and recreational activities which will be included later in a volume on "Recreational Therapy." Volume I of the series is on "Occupational Therapy."

Sir Watson-Jones, in his foreword says: "The death knell of massage has been sounded. No longer must the patient be lulled to sleep with soothing massage: he must be galvanized into activity by invigorating exercise."

Parts 1 and 2 deal with the theory and rationale of specific remedial exercises. Part 3 describes the types of splints and plaster casts which are used for the commoner bone and joint injuries, and draws attention to the constructional defects which may interfere with or prevent the free joints from being exercised adequately. Part 4 deals with the use of exercises with special remedial apparatus such as suspension slings, cord and pulley and weight and pulley circuits. Part 5 consists of a number of specimen tables of graded remedial exercises which have been arranged for use in the treatment of the commoner traumatic conditions. Parts 6 and 7 deal with the treatment of amputation stumps, and the theoretical and practical aspects of reeducation in walking.

This work should be read by physical therapists whose work is to apply and elaborate the principles underlying exercise therapy.

A Synopsis of Orthopedic Surgery. *By A. David Le Vay, M.S., Lond., F.R.C.S., Eng., Honorary Orthopedic Surgeon, Woolwich Memorial Hospital; Late Surgical Registrar, Royal National Orthopedic Hospital; Late Senior Surgeon, Ministry of Pensions. Cloth. Price 15c. net. Pp. 242, with 55 illustrations. H. K. Lewis & Co., Ltd., 136 Gower St., London, England, 1947.*

This book gives a concise factual survey of orthopedic surgery. The author brings out that the patient seen with a lesion is only a three-dimensional cross-section of a continuing disease process, that the events leading up to his present state as well as those likely to follow it must be contemplated; and that the probable effects of the disease on the individual and the individual on his disease must determine the nature, the extent and the time of surgical intervention. In orthopedics the surgeon very often has to take a long view, to be conservative where natural healing is likely, to assist nature when this is possible and desirable from an economic point of view.

This book should be of interest to senior undergraduate medical students.

Meet Our New Contributors

Forman, Beatrice, 504 Washington St., Brookline, Mass. Miss Forman graduated from Boston University College of Physical Education for Women, Sargent College, Cambridge, Mass., in May 1944, with a B.S. degree in Physical Education which included her physical therapy training. She was stationed at the Cushing General Hospital, Framingham, Mass., from May 1944 to September 1946, when she accepted her present position at Virginia Hospital, Bedford, Mass. Member: American Physiotherapy Association.

Handschy, June E., Maryview Hospital, Portsmouth, Va. Miss Handschy spent one year at the University of Illinois in Urbana; transferred to American College of Physical Education in Chicago, Illinois, where she received her B.S. degree in Physical Education in June 1941. She received her certificate of physical therapy from University of Wisconsin at Madison in 1942. She has been employed at the Curative Workshop in Milwaukee, Wis.; as Chief Physical Therapist in the U. S. Army; as Head Physical Therapist, Dept. Physical Med., Mt. Sinai Hosp., Milwaukee, Wis.; with the Veterans Administration, Mountain Home, Tenn.; and at present is Head Physical Therapist, Dept. of Phys. Med., Maryview Hospital, Portsmouth, Va. Member: American Physiotherapy Association.

Lewey, F. H., M.D., 3400 Spruce St., Philadelphia 4, Pa. Doctor Lewey received his M.D. degree from the University of Zurich and Berlin, Medical School, in 1910. He was Chief of Neurological Section, Cushing General Hospital, Framingham, Mass., from 1944 to 1946. His present position is that of Professor of Neuroanatomy, Graduate School, and Assistant in Neurosurgery, Medical School, University of Pennsylvania.

Mitchell, Holland C., M.D., 812 Beloit Ave., Forest Park, Ill. Doctor Mitchell received his B.A. degree from the University of Texas in 1929, and his M.D. degree from the University of Texas Medical School in 1933. He also took the Course in Physical Medicine at Northwestern University Medical School in 1943, and a course in the treatment of the severely crippled and disabled at the Institute for the Crippled and Disabled, New York City, in 1945. Member: American Medical Association, American Congress of Physical Medicine, American Psychiatric Association.

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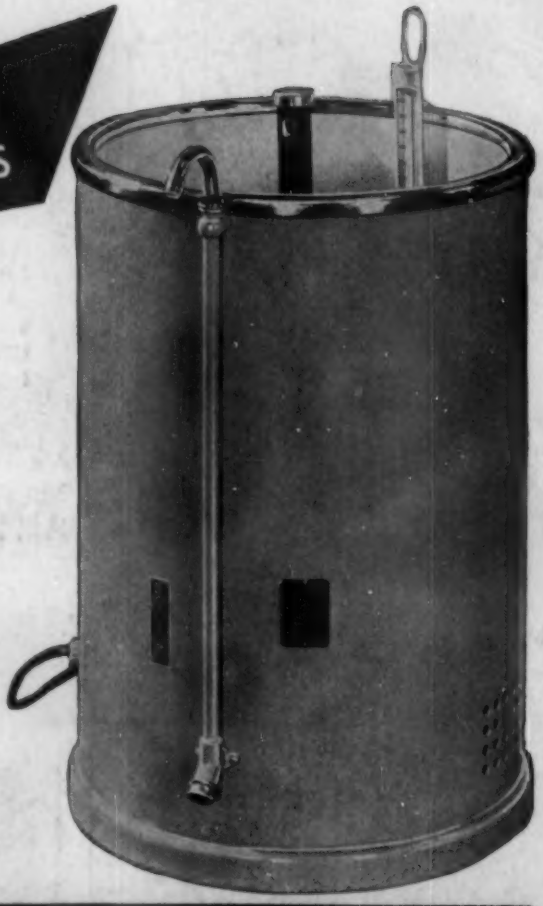

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